THERMO KING

Installation Manual

Truck Edition (TSA, ESA and AP)

Single Temperature Systems

T-570R, T-800M and T-1000M (with TSR Controller)
T-600, T-600R, T-800, T-800R, T-1000, T-1000R (with SR-3 Controller)

TK 55212-1-IM (Rev. 2, 03/13)

Ingersoll Rand

Installation Manual

Truck Edition (TSA, EMEIA and AP)
Single Temperature Systems
T-580R, T-800M and T-1000M (with TSR Controller)
T-680S, T-880S, T-1080S (with SR-3 Controller)
T-600R, T-680R, T-800R, T-880R, T-1000R and T-1080R (with SR-3 Controller)
T-1200R (EMEIA Only with SR-3 Controller)

TK 55212-1-IM (Rev. 2, 03/13)

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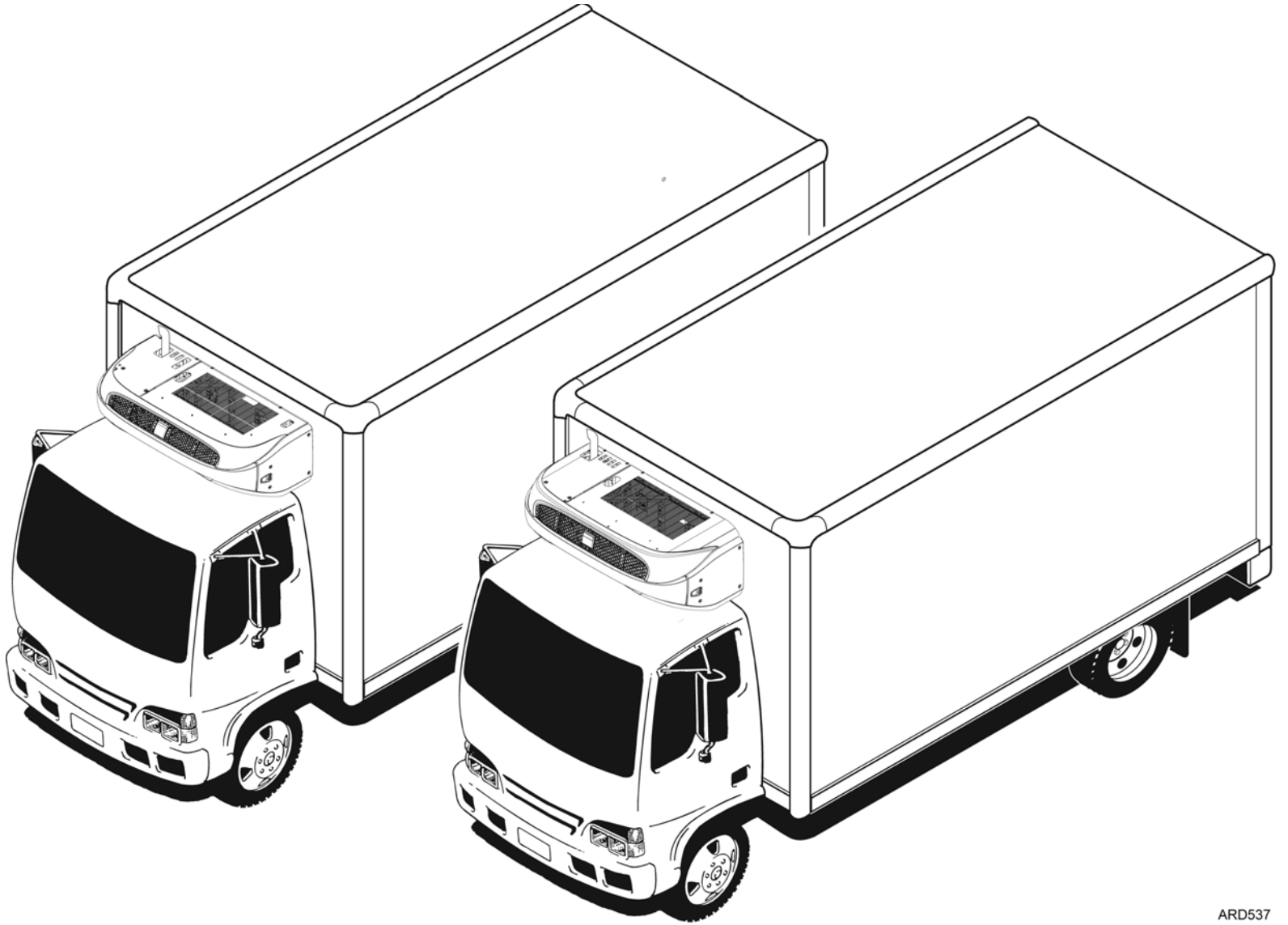
Release History

Original	(09/11)	Released
Rev. 1	(02/13)	Pages 20, 21, 23, 27 and 29 - Changed art to show revised lifting bar with forged clevis and pins, forged connecting links and forged locking hooks used for lifting the unit.
Rev. 2	(03/13)	Updated manual to include new Tier IV units.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Introduction

This manual was written to assist with the installation of **Thermo King T-Series Systems** onto truck bodies specifically designed and built for these applications.

Due to its complexity, you should not attempt this installation unless you:

- Are an experienced mechanic.
- Can safely lift 34 kilos (75 lbs.).
- Are certified or trained in the repair and maintenance of diesel powered refrigeration systems.
- Have a basic understanding of electricity and electrical wiring.
- Have the necessary tools and equipment to complete the installation.

This manual is published for informational purposes only. Thermo King makes no representations warranties express or implied, with respect to the information recommendations and descriptions contained herein. Information provided should not be regarded as all-inclusive or covering all contingencies. If further information is required, Thermo King Corporation Service Department should be consulted.

Thermo King's warranty shall not apply to any equipment which has been "so installed, maintained, repaired or altered as, in the manufacturer's judgment, to affect its integrity."

Manufacturer shall have no liability to any person or entity for any personal injury, property damage or any other direct, indirect, special, or consequential damages whatsoever, arising out of the use of this manual or any information, recommendations or descriptions contained herein.

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Safety Precautions

The symbol appears next to a point that is particularly important:

DANGER: Addresses a circumstance that, if encountered, will lead to death or serious injury

WARNING: Addresses a circumstance that, if encountered, might lead to death or serious injury.

CAUTION: Addresses a circumstance that, if encountered, may cause damage to equipment or minor injury.

DANGER: Never operate the unit with the discharge valve closed because it could cause the compressor to explode, causing death or serious injury.

DANGER: Never apply heat to a sealed refrigeration system or container because it could explode, causing death or serious injury

DANGER: Fluorocarbon refrigerants, in the presence of an open flame or electrical short, produce toxic gases that are severe respiratory irritants capable of causing death.

DANGER: Be careful when working with a refrigerant or refrigeration system in any enclosed or confined area with a limited air supply (i.e., a trailer, container or the hold of a ship). Refrigerant tends to displace air and can cause oxygen depletion which may result in death by suffocation.

WARNING: Always wear goggles or safety glasses. Refrigerant liquid, refrigeration oil, and battery acid can permanently damage the eyes (see First Aid under Refrigeration Oil).

WARNING: Keep your hands away from fans and belts when the unit is running. This should also be considered when opening and closing the compressor service valves.

WARNING: Make sure gauge manifold hoses are in good condition. Never let them come in contact with a belt, fan motor pulley, or any hot surface.

WARNING: Make sure all mounting bolts are tight and are of correct length for their particular application

WARNING: Never drill holes in the unit unless absolutely necessary. Holes drilled into the unit may weaken structural components. Holes drilled into electrical wiring can cause fire or explosion.

WARNING: When using ladders to install or service refrigeration systems, always observe the ladder manufacturer's safety labels and warnings. A work platform is the recommended method for installations.

WARNING: Exposed coil fins are very sharp and can cause painful lacerations.Wear leather work gloves to prevent injury.

Safety Precautions (continued)

Battery Installation and Cable Routing

WARNING: Improperly installed battery could result in a fire or explosion! A Thermo King approved battery must be installed and properly secured to the battery tray.

WARNING: Improperly installed battery cables could result in fire or explosion! Battery cables must be installed, routed and secured properly to prevent them from rubbing, chaffing or making contact with hot, sharp or rotating components.

WARNING: Do not attach fuel lines or any additional wiring harnesses to the battery cables as this could cause an electrical fire!

CAUTION: Do not connect other manufacturer's equipment or accessories to the Thermo King unit. This could result in severe damage to equipment and void the warranty!

CAUTION: Set all unit electrical controls to the OFF position before connecting battery cables to the battery to prevent unit from starting unexpectedly and causing personal injury.

CAUTION: Always wear protective clothing, gloves and eye wear when handling and installing batteries. Battery acid can cause serious burns when exposed to eyes or skin. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.

CAUTION: Always cover battery terminals to prevent them from making contact with metal components during battery installation. Battery terminals grounding against metal could cause the battery to explode.

Refrigerant

WARNING: Although fluorocarbon refrigerants are classified as safe refrigerants, certain precautions must be observed when handling them or servicing a unit in which they are used. When released to the atmosphere in the liquid state, fluorocarbon refrigerants evaporate rapidly, freezing anything they contact.

First Aid

FROST BITE: In the event of frost bite, the objectives of First Aid are to protect the frozen area from further injury, to warm the affected area rapidly and to maintain respiration.

EYES: For contact with liquid, immediately flush eyes with large amounts of water and get prompt medical attention.

SKIN: Flush area with large amounts of lukewarm water. Do not apply heat. Remove contaminated clothing and shoes. Wrap burns with dry, sterile, bulky dressing to protect from infection/injury. Get medical attention. Wash contaminated clothing before reuse.

INHALATION: Move victim to fresh air and use CPR or mouth-to-mouth ventilation, if necessary. Stay with victim until arrival of emergency medical personnel.

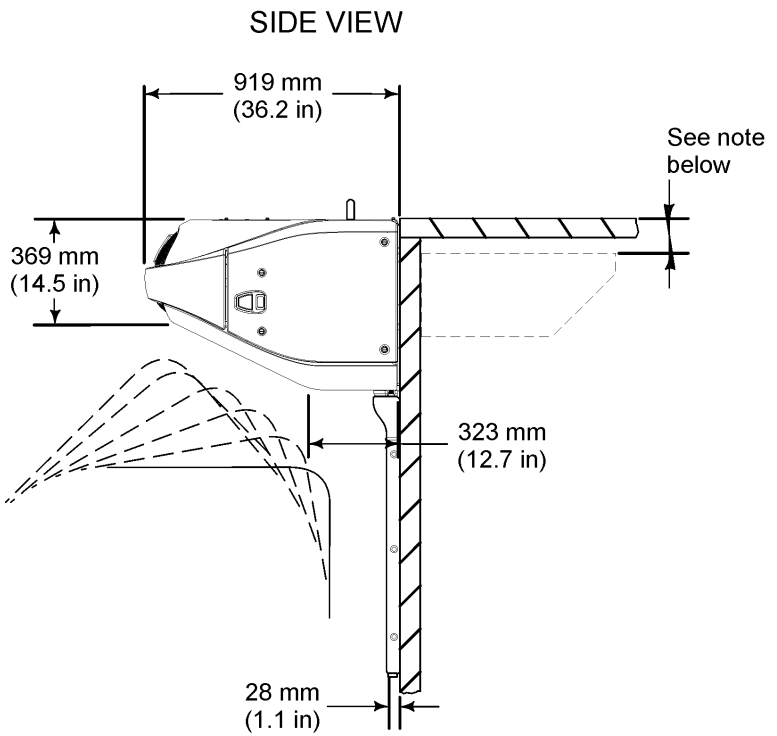
Refrigeration Oil

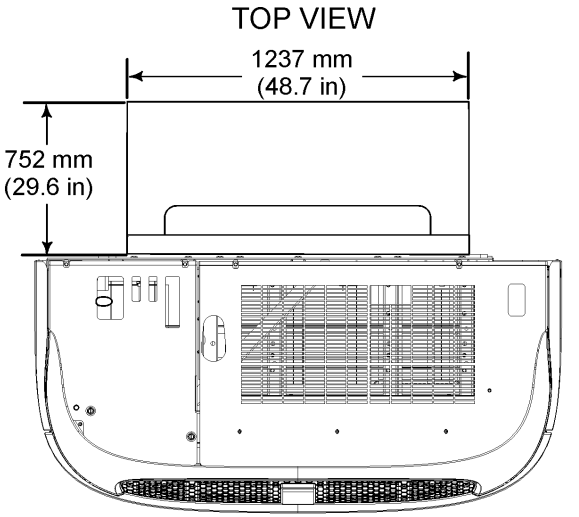
WARNING: Avoid refrigeration oil contact with the eyes. Avoid prolonged or repeated contact of refrigeration oil with skin or clothing. Wash thoroughly after handling refrigeration oil to prevent irritation.

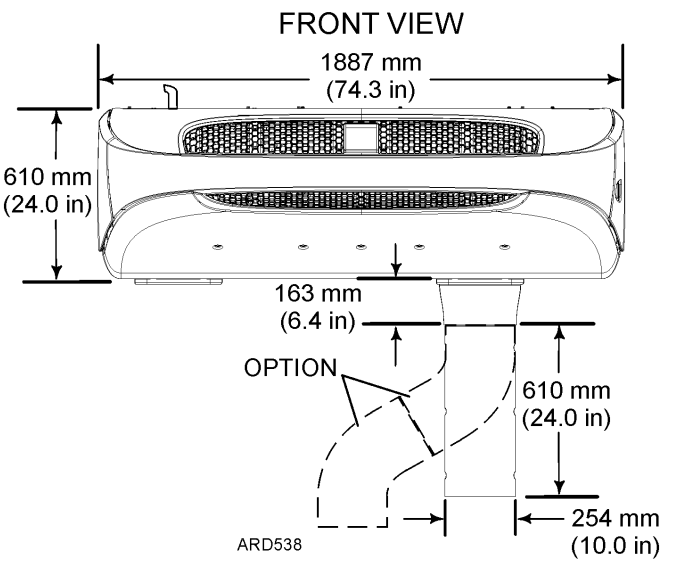
First Aid

NOTE: In case of eye contact, immediately flush with plenty of water for at least 15 minutes. CALL A PHYSICIAN. Wash skin with soap and water.

Unit Dimensions - T-580R, T-600R T-680R, T-680R, T-680S, T-800M, T-800R, T-880R, T-880S





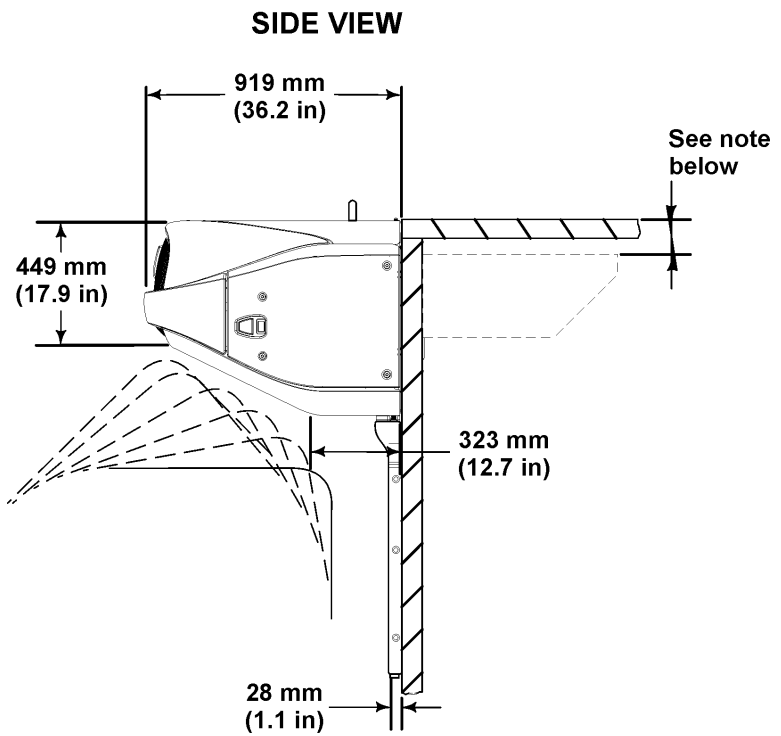


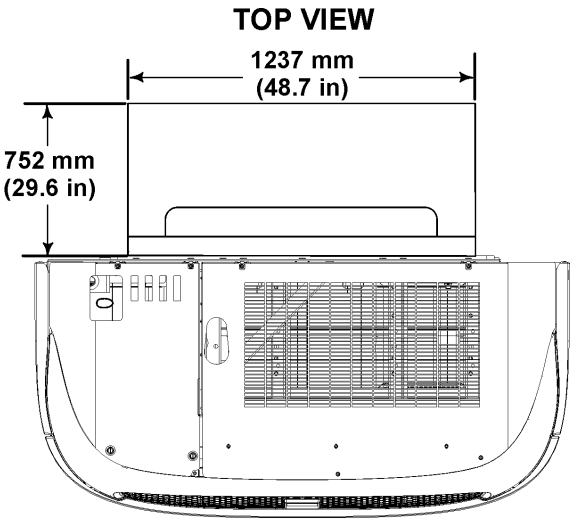
NOTE: The top of the unit to be mounted flush with the top of the cargo box when possible. The top of the evaporator to be positioned 25.4 mm (1.00 in.) below ceiling.

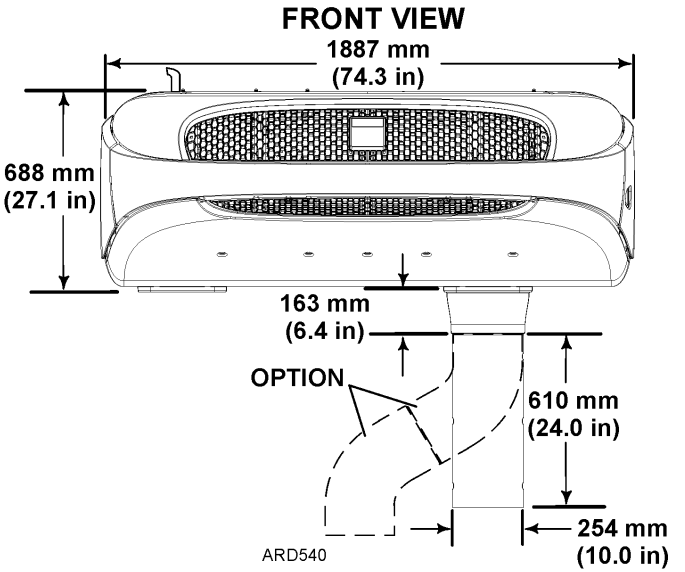
The dimension from the top of the cargo box to the evaporator cutout will vary depending on the type of box, truck cab tilt clearance. etc.

T-580 through T-880 series units minimum dimension = 107 mm (4.25 in.)

Unit Dimensions T-1000M, T-1000R, T-1080R, T-1080S and T-1200R





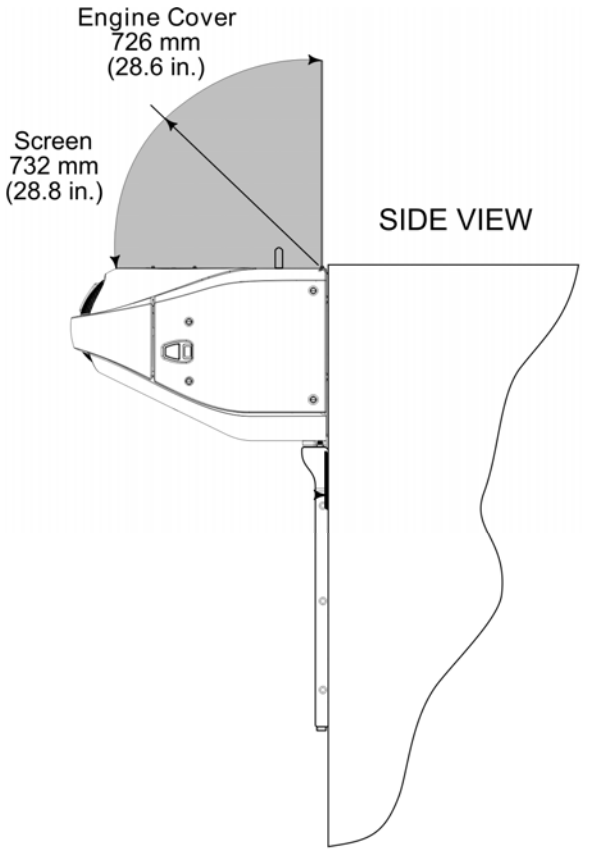


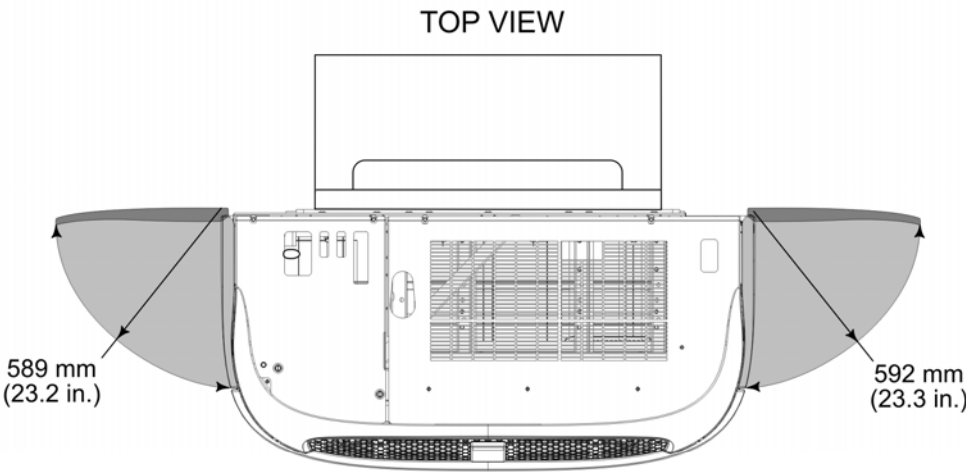
NOTE: The top of the unit to be mounted flush with the top of the cargo box when possible. The top of the evaporator to be positioned 25.4 mm (1.00 in.) below ceiling.

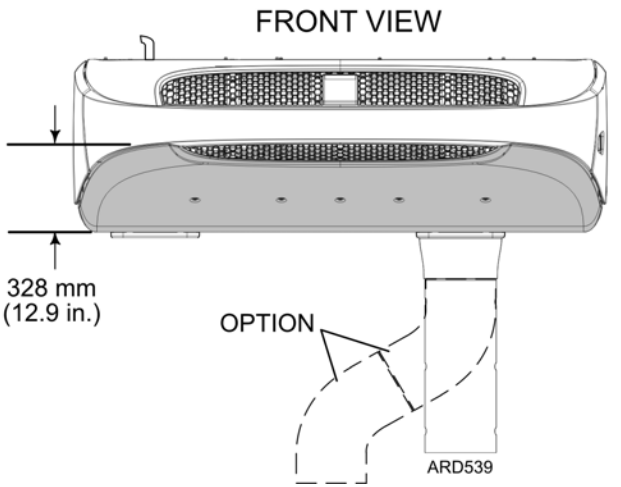
The dimension from the top of the cargo box to the evaporator cutout will vary depending on the type of box, truck cab tilt clearance. etc.

T-1000 through T-1200 series minimum dimension = 147 mm (5.75 in.)

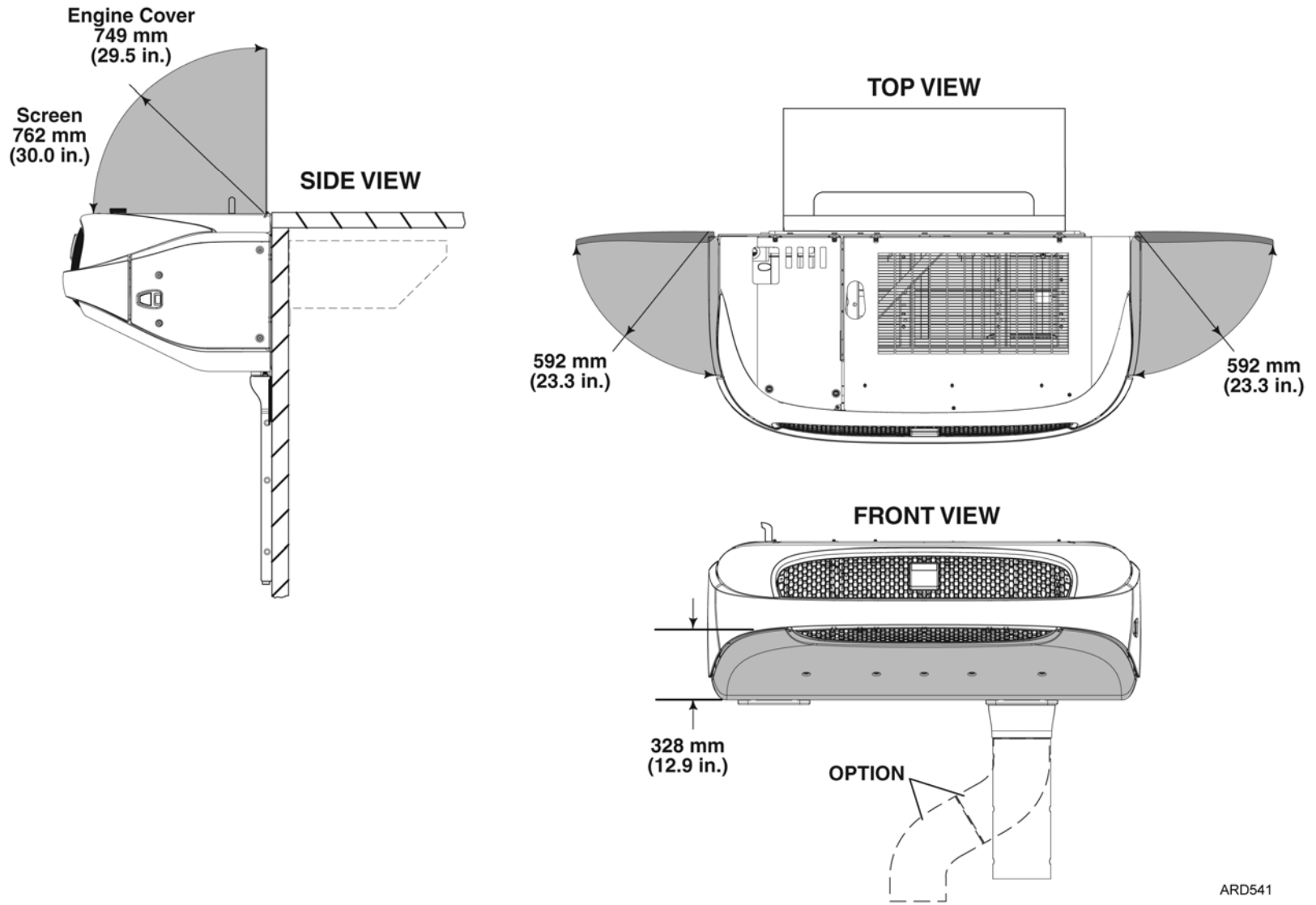
Service Area - T-580R, T-600R T-680R, T-680R, T-680S, T-800M, T-800R, T-880R, T-880S





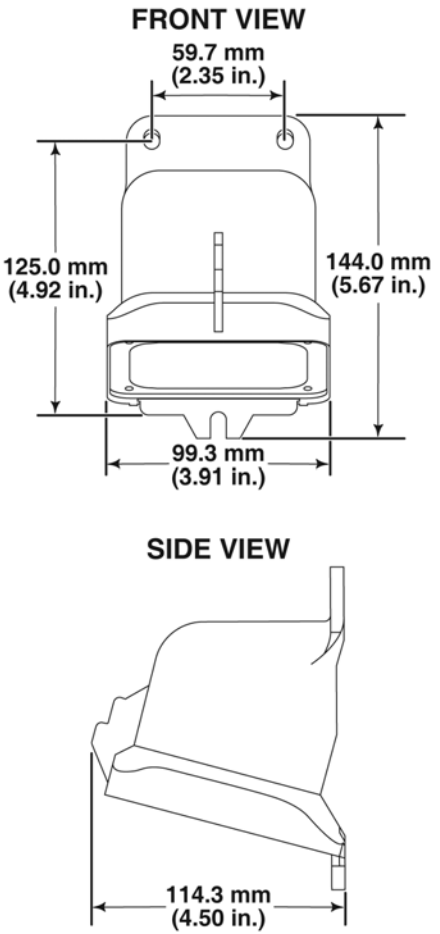


Service Area - T-1000M, T-1000R, T-1080R, T-1080S and T-1200R

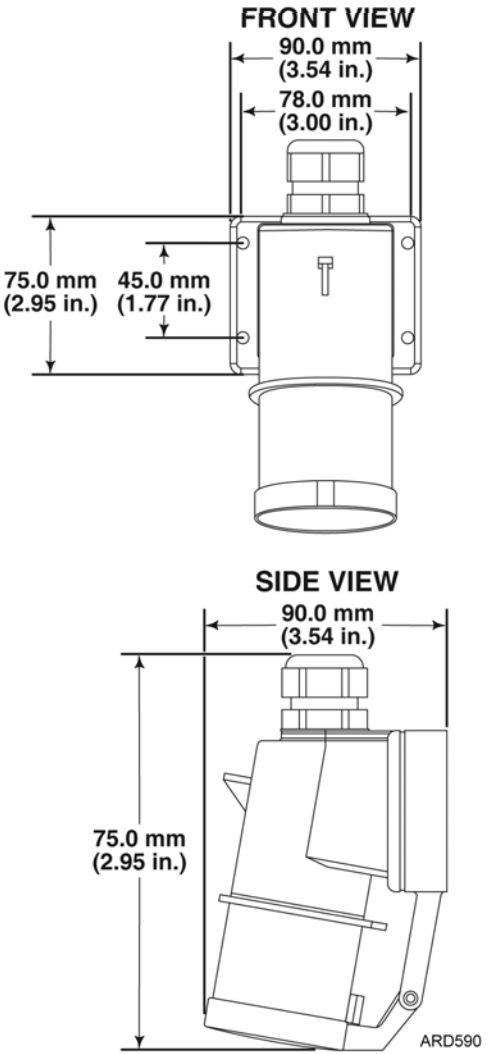


Remote Power Receptacle Dimensions (OPTION)

NORTH AMERICAN MODELS

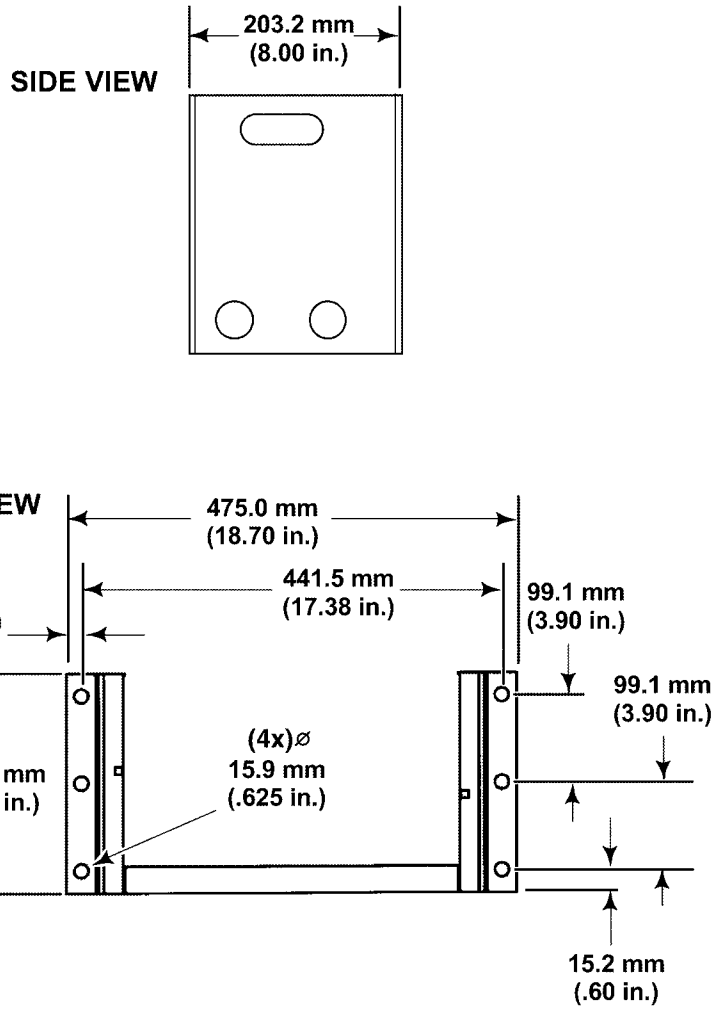


INTERNATIONAL MODELS

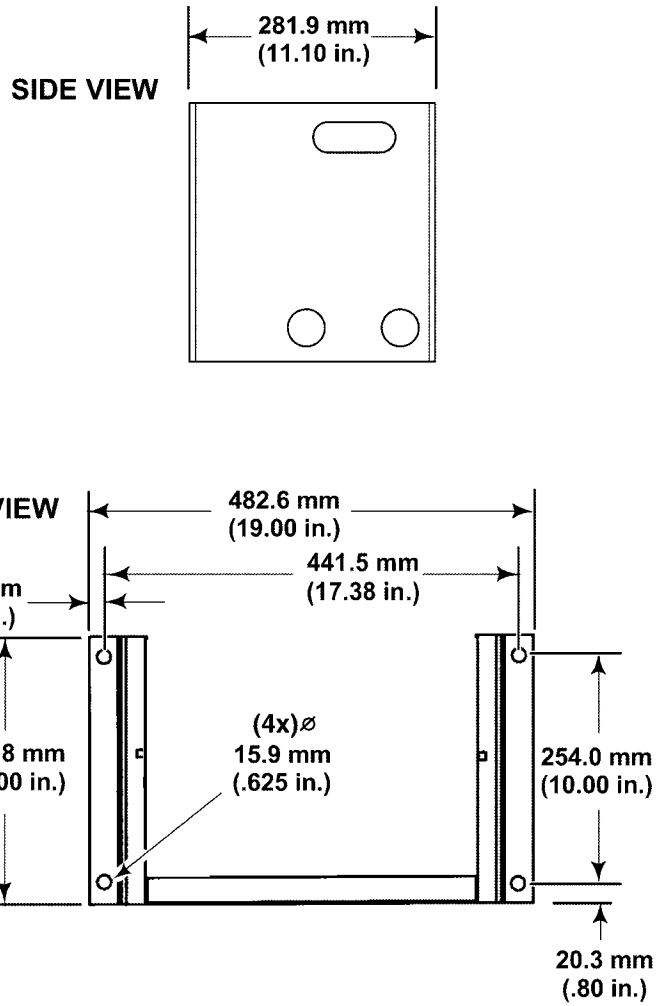


Battery Box Dimensions (OPTION)

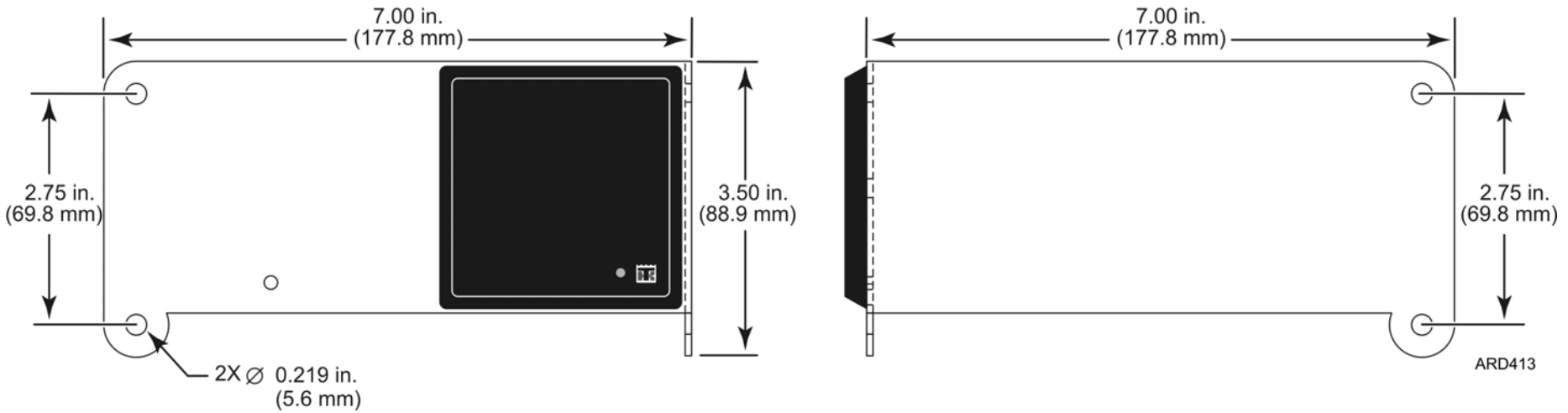
INTERNATIONAL MODELS



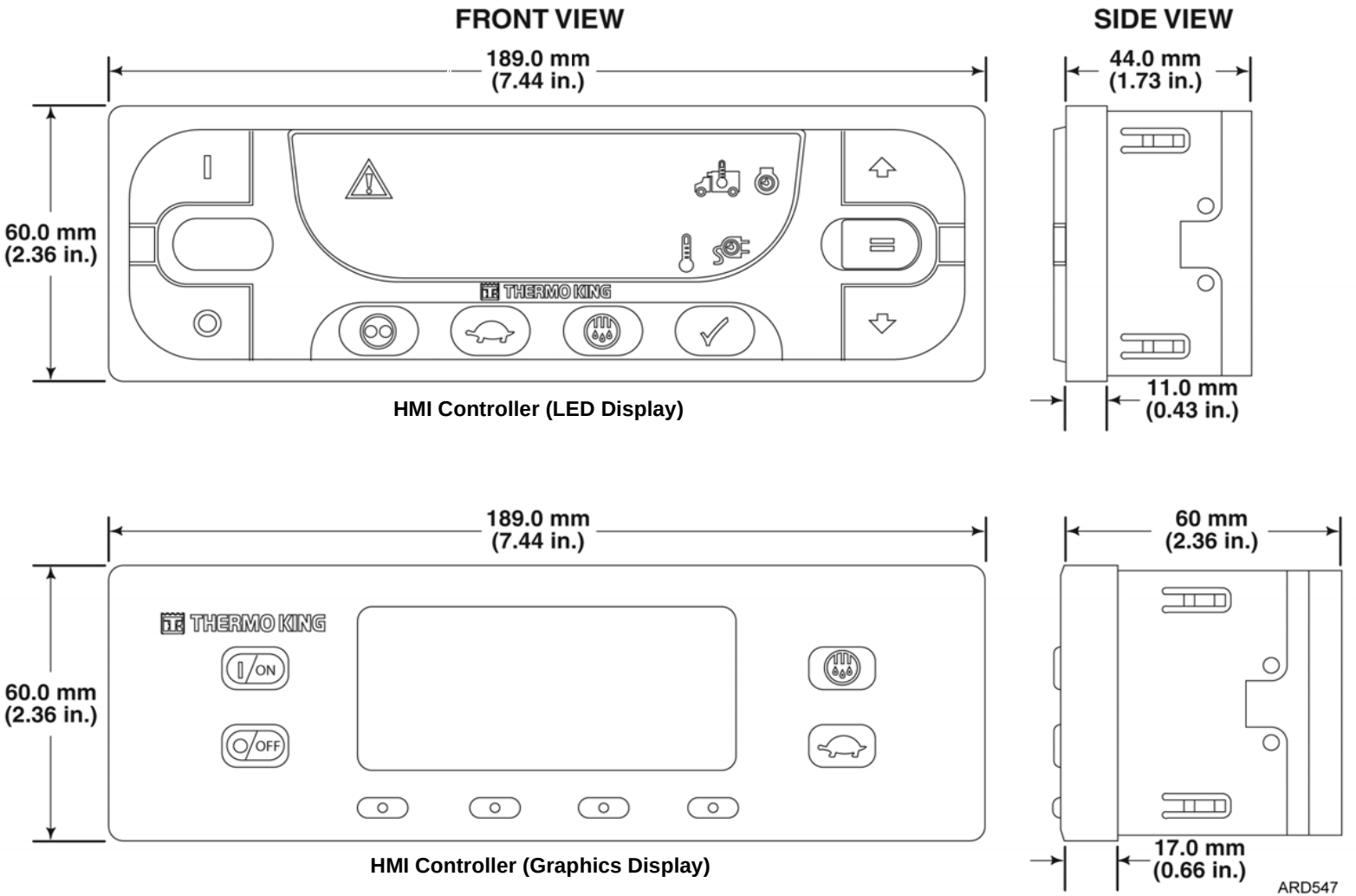
NORTH AMERICAN MODELS



Remote Status Light Dimensions (OPTION)

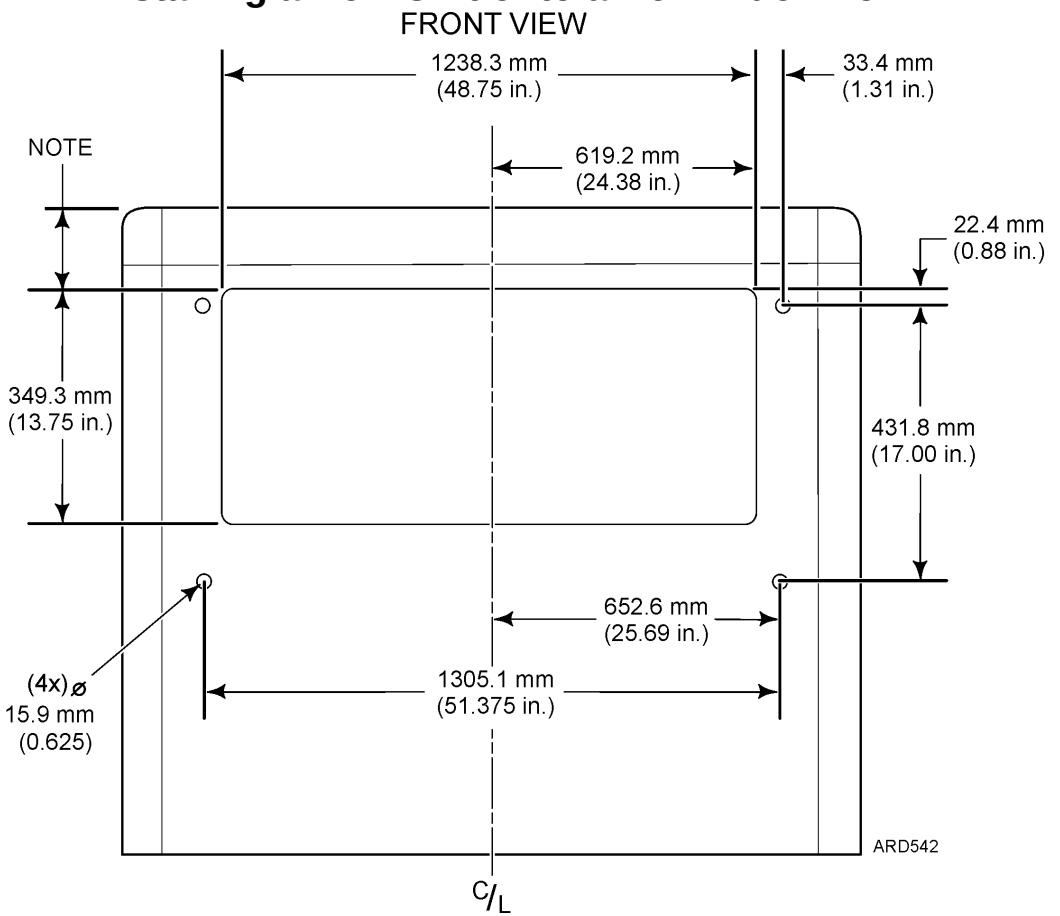


HMI Controller Dimensions



Truck Body Opening Dimensions

Installing a New Unit onto a New Truck Box



NOTE: The top of the unit to be mounted flush with the top of the cargo box when possible. The top of the evaporator to be positioned 25.4 mm (1.00 in.) below ceiling.

The dimension from the top of the cargo box to the evaporator cutout will vary depending on the type of box, truck cab tilt clearance. etc.

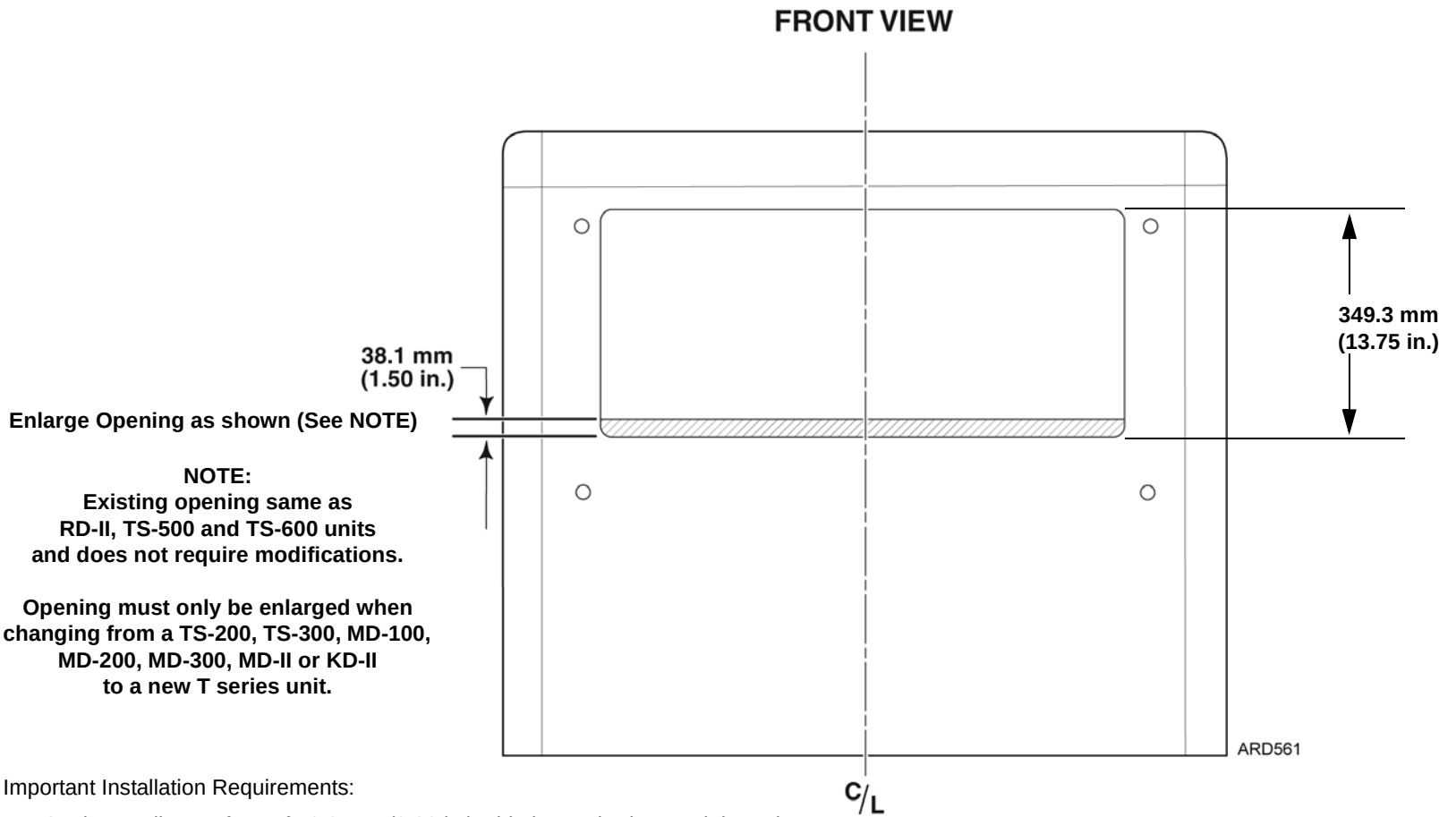
T-580 through T-880 series minimum dimension = 107 mm (4.25 in.)

Important Installation Requirements:

- Gasket sealing surface of 50.8 mm (2.00 in.) wide is required around the unit opening. This surface must be flat within 6.4 mm (0.25 in.) and free of all rivets or head b proper gasket sealing.
- The top of the evaporator to be positioned 25.4 mm (1.00 in.) below ceiling.
- Unit mounting location must allow for adequate tilt clearance (see Unit Dimensions).

Truck Body Opening Dimensions

Retrofitting a New Unit onto a Older Truck Box



Important Installation Requirements:

- Gasket sealing surface of 50.8 mm (2.00 in.) wide is required around the unit opening. This surface must be flat within 6.4 mm (0.25 in.) and free of all rivets or head bolts for proper gasket sealing.
- Evaporator to be positioned 25.4 mm (1.00 in.) below ceiling.
- Unit mounting location must allow for adequate tilt clearance (see Unit Dimensions).

Unit Weights

CAUTION: The truck wall must be structurally strong enough to support the weight of the refrigeration unit.

Model 30 Units (approximate weight)

T-580R	434 kg (957 lbs.)
T-600R	443 kg (977 lbs.)
T-680R	437 kg (963 lbs.)
T-680S	447 kg (985 lbs.)
T-800R	443 kg (977 lbs.)
T-880R	437 kg (963 lbs.)
T-880S	447 kg (985 lbs.)
T-800M	443 kg (977 lbs.)
T-1000M	476 kg (1029 lbs.)
T-1000R	461 kg (1016 lbs.)
T-1080R	453 kg (999 lbs.)
T-1080S	459 kg (1012 lbs.)
T-1200R	475 kg (1046 lbs.)

Model 50 Units (approximate weight)

T-580R	459 kg (1012 lbs.)
T-600R	468 kg (1032 lbs.)
T-680R	462 kg (1018 lbs.)
T-680S	472 kg (1040 lbs.)
T-800R	468 kg (1032 lbs.)
T-880R	462 kg (1018 lbs.)
T-880S	472 kg (1040 lbs.)
T-800M	468 kg (1032 lbs.)
T-1000M	516 kg (1138 lbs.)
T-1000R	510 kg (1125 lbs.)
T-1080R	502 kg (1108 lbs.)
T-1080S	508 kg (1121 lbs.)
T-1200R	524 kg (1155 lbs.)

Lifting Bar Details

IMPORTANT: All T-580 through T-1200 series truck units require a new lifting bar. This new bar must be used to safely lift and install these series units. This new lifting bar can also be used to install earlier series truck units.

WARNING: Thermo King requires a 3 point lifting bar to safely lift and install units. A lifting bar can be made from the drawings provided.

WARNING: All hardware used to assemble the lifting bar must be DIN 931 class 10.9 (SAE Grade 8). The use of hardware other than specified may cause personal injury, severe damage to the equipment and void the warranty.

WARNING: Use forged clevis and pins, forged chain links and forged locking hooks with strength equal to total lift capacity of hoist mechanism and that meet all safety standards.

Lifting Bar Details

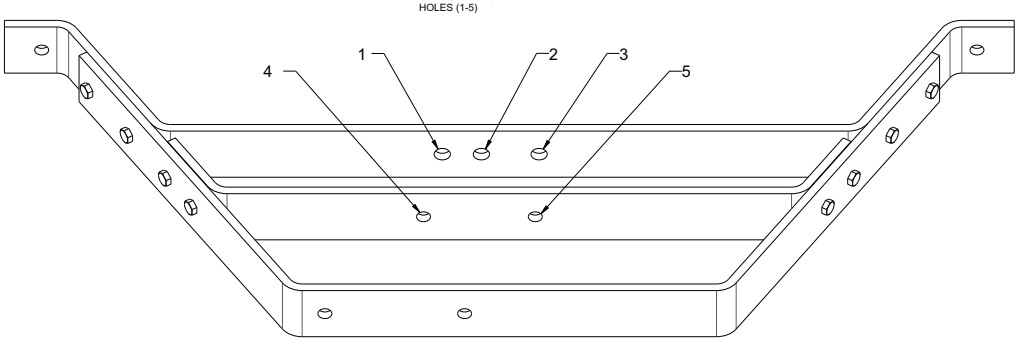
UNIT TYPE	FRONT CHAIN LIFT HOLE LOCATION	ENTIRE UNIT CLEVIS LIFTING HOLE LOCATION
TS 200/300/500/600 - 30	LEFT HOLE	1
TS 200/300/500/600 - 50	LEFT HOLE	2
SPECTRUM TS	LEFT HOLE	4
MD II, MD 200, MD 300 - 30	RIGHT HOLE	1
MD II, MD 200, MD 300 - 50	RIGHT HOLE	2
KD II - 30	RIGHT HOLE	1
KD II - 50	RIGHT HOLE	2
RD II - 30	RIGHT HOLE	1
RD II - 50	RIGHT HOLE	2
T SERIES - 30/50	LEFT HOLE	3
T SERIES SPECTRUM	LEFT HOLE	5

RELEASED 14/Jan/2013

REVISIONS

CHANGE ORDER	REV	DESCRIPTION	DATE	APPROVED
529536	F	MOVED LIFTING HOLES ALONG REAR BAR, ADDED BRIDGING BAR FOR SPECTRUM TS LIFTING POINT. ADDED WELD SYMBOLS, RE-LABLED ALL LIFTING POINTS	18-Jun-08	M GILMAN
532334	G	ADDED LIFTING HOLES FOR NEW UNITS, ADDED BRIDGING BAR FOR MULTI-TEMPS.	25-Mar-09	M GILMAN
539147	H	DIM 17.22 WAS 16.42. DIM 11.12 WAS 10.42. ADDED TSERIES SPECTRUM VIEW	20-Jan-10	E KIRBY
543699	I	CHG DRAWING AND VIEWS, MOVED HOLES 1-6, ADDED TABLE FOR ALL TRUCK UNITS.	14-Jun-10	M GILMAN
665985	J	REMOVED CHAINS, BOLTS FROM VIEW SHT 1, DEL NOTE 2.	27-NOV-12	J.DAVIES

ENTIRE UNIT
CLEVIS LIFTING
HOLES (1-5)



NOTES:
2. ~~USE TWO CHAIN LINKS WITH A CHAIN LINK MASTER AS SHOWN.~~
3. USE THREE FORGED CLEVIS AND PINS TO ATTACH LIFTING CHAINS.
4. EACH ASSEMBLY MUST HAVE STRENGTH EQUAL TO MINIMUM OF 1.5 TIMES THE WEIGHT OF THE HOIST AND MEET ALL SAFETY STANDARDS.

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THIRD ANGLE PROJECTION

FINISH -

CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE.
UNLESS OTHERWISE SPECIFIED TOLERANCES ON DIMENSIONS PER TX00/109

		DATE
DRAWN	JO	1/20/88
CHECKED	TB	6/15/90
APPROVED	RL	6/15/90
ENG APPVL	-	-

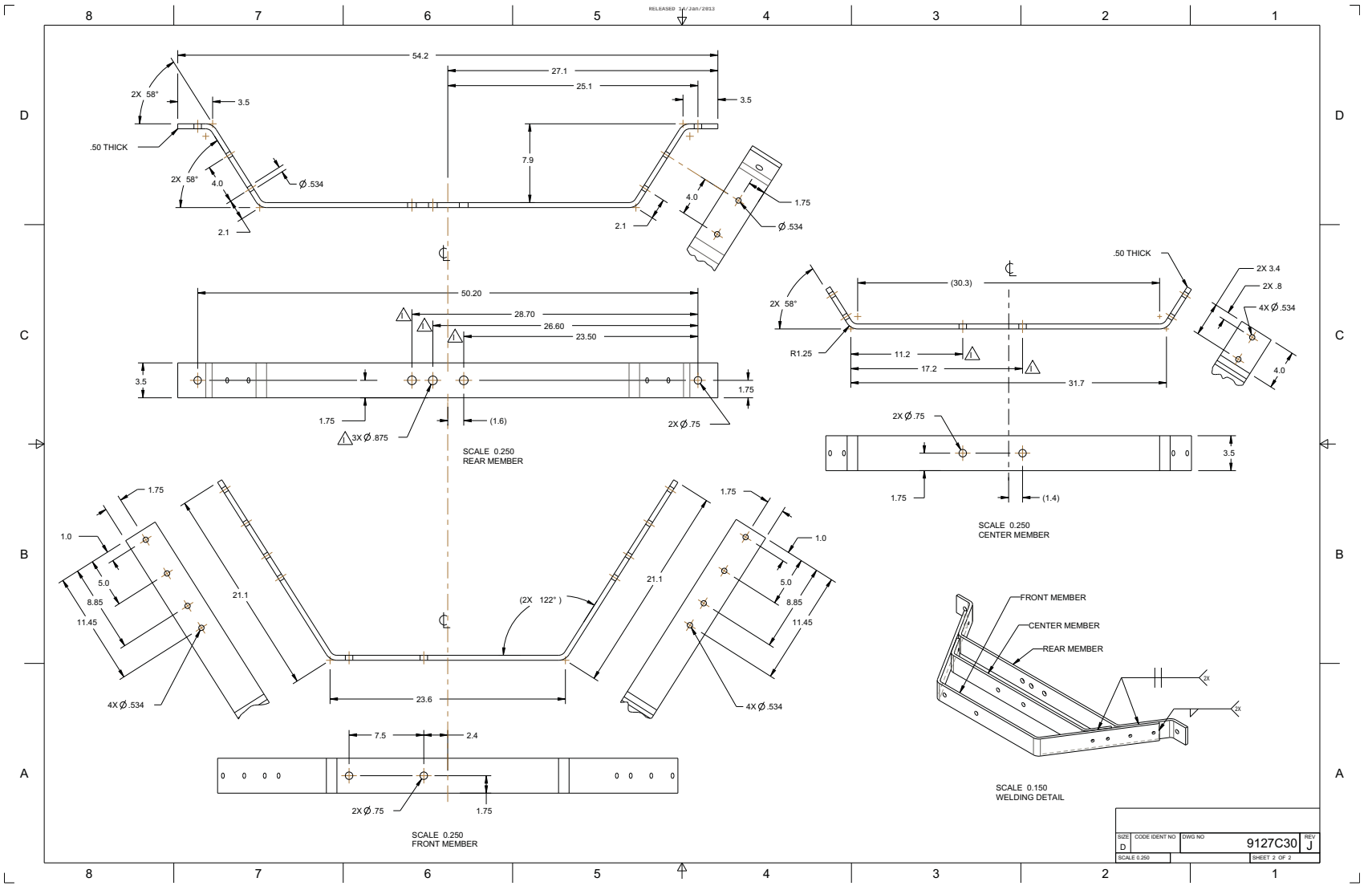
Ingersoll-Rand. Thermo King

TITLE: DIAGRAM-LIFTING BAR ASS'Y FOR SELF-POWERED LARGE TRUCK

SIZE	CODE IDENT NO	DWG NO	REV
D		9127C30	J

SCALE 0.250 SHEET 1 OF 2

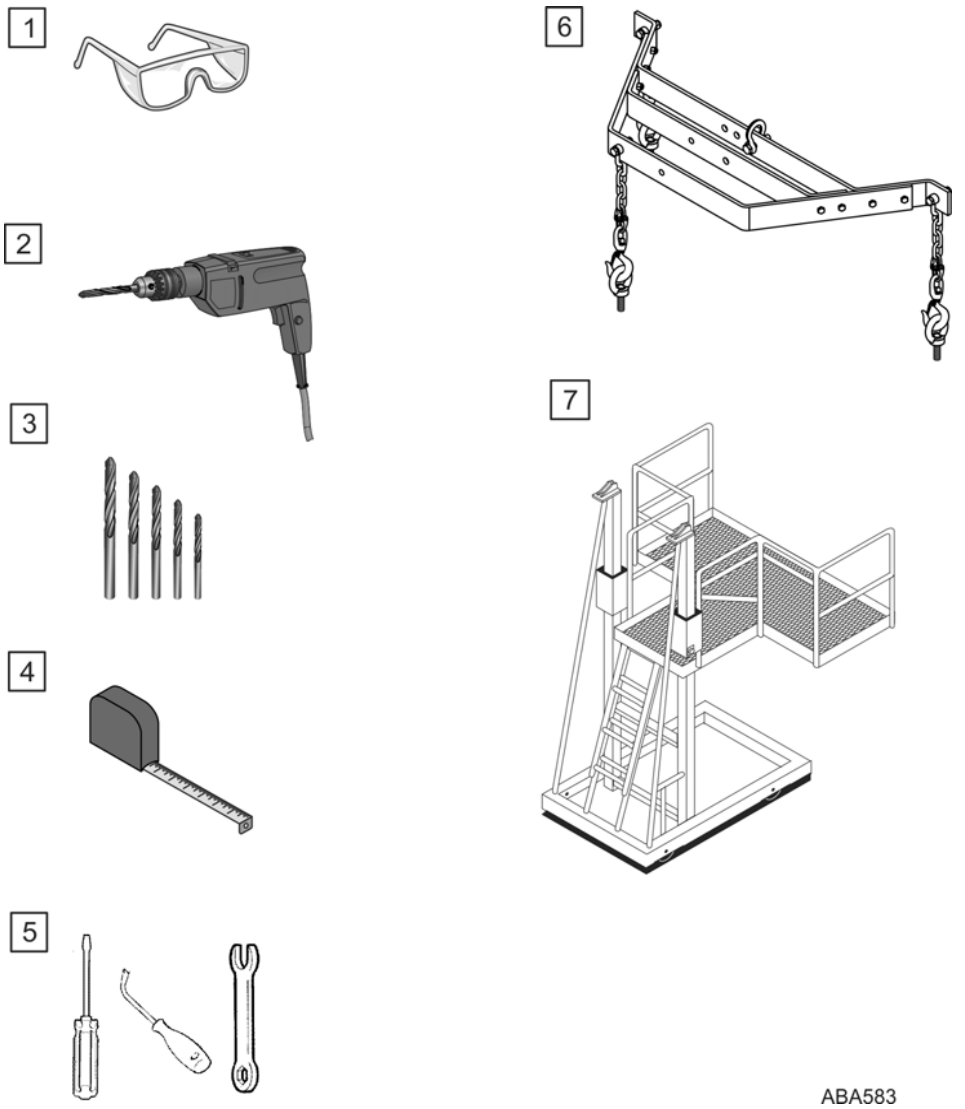
Lifting Bar Details



Required Tools

1. Safety Glasses
2. Drill
3. Drill Bits
4. Tape Measure
5. Mechanics Tools
6. Lifting Bar (New Style Design Required) with forged clevis and pins, forged connecting links and forged locking hooks.
7. Work Platform (Recommended)

Required Tools

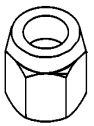


Installation Components

1. Unit Mounting Washers 1.250 x 0.188 THK
2. Locking Nuts 1/2-13
3. Torx Head Screws
4. Hose Management Cap s
5. Hold Down Clamps
6. #14 Sheet Metal Screws
7. Drain Hose Check Valves
8. Fuel Pump
9. Fuel Pump Bracket
10. Screws HH 1/4-20 SS
11. Locking Nuts 1/4-20 SS
12. Fuel Pickup Tube
13. Fuel Line Fittings
14. Clamps
15. Self Tapping Screws #10 HWHSM
16. In-Line Fuse Holder
17. Fuse 60 amp
18. Terminal Connector Splice
19. Heat Shrink Sleeving 3.00"
20. Terminal Red 3/8"
21. Terminal Lug 3/8"
22. Cable Ties
23. Muffler Gasket
24. Exhaust Tube Extension
25. Nut-Blind
26. HMI Controller
27. HMI DIN Mount
28. Oil Drain Hose Retainer

Installation Components

1

2


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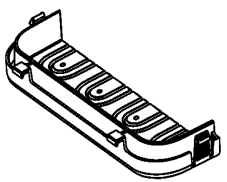

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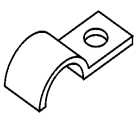

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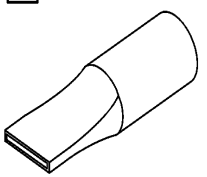

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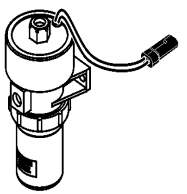

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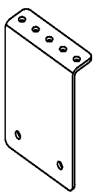

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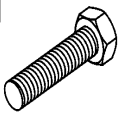

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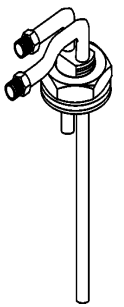

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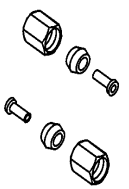

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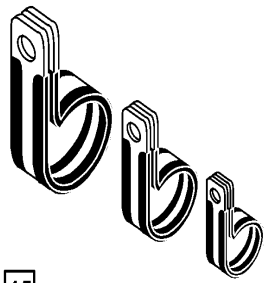

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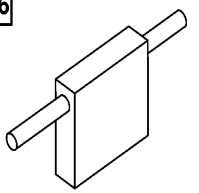

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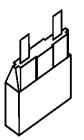

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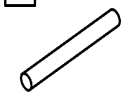

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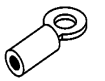

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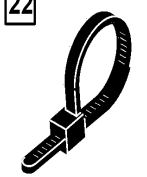

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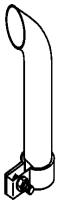

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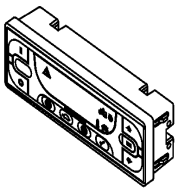

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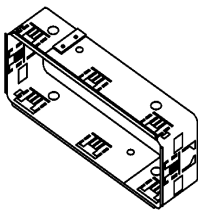

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ARD555

Uncrating the Unit

Important Unit Lifting Information

NOTE: All T-580 through T-1200 series truck units require a new lifting bar. This new bar must be used to safely lift and install these series units. This new bar must be used to safely lift and install these series units. See "Lifting Bar Details" on page 19.

WARNING: Thermo King requires a 3 point lifting bar to safely lift and install units. A lifting bar can be made from the drawings provided. See "Lifting Bar Details" on page 19 .

WARNING: Use forged clevis and pins, forged chain links and forged locking hooks with strength equal to total lift capacity of hoist mechanism and that meet all safety standards.

WARNING: Installer supplied lifting eyebolts must be forged steel, 12 mm, 1.75 pitch, minimum 20.5 mm long. Substitutions are not acceptable!

WARNING: Use only locking lifting hooks to attach to the lifting eyebolts (Detail A).

WARNING: The point shown in Detail B below is not a major lifting point. It is used only to level and balance the unit during installation (Detail B).

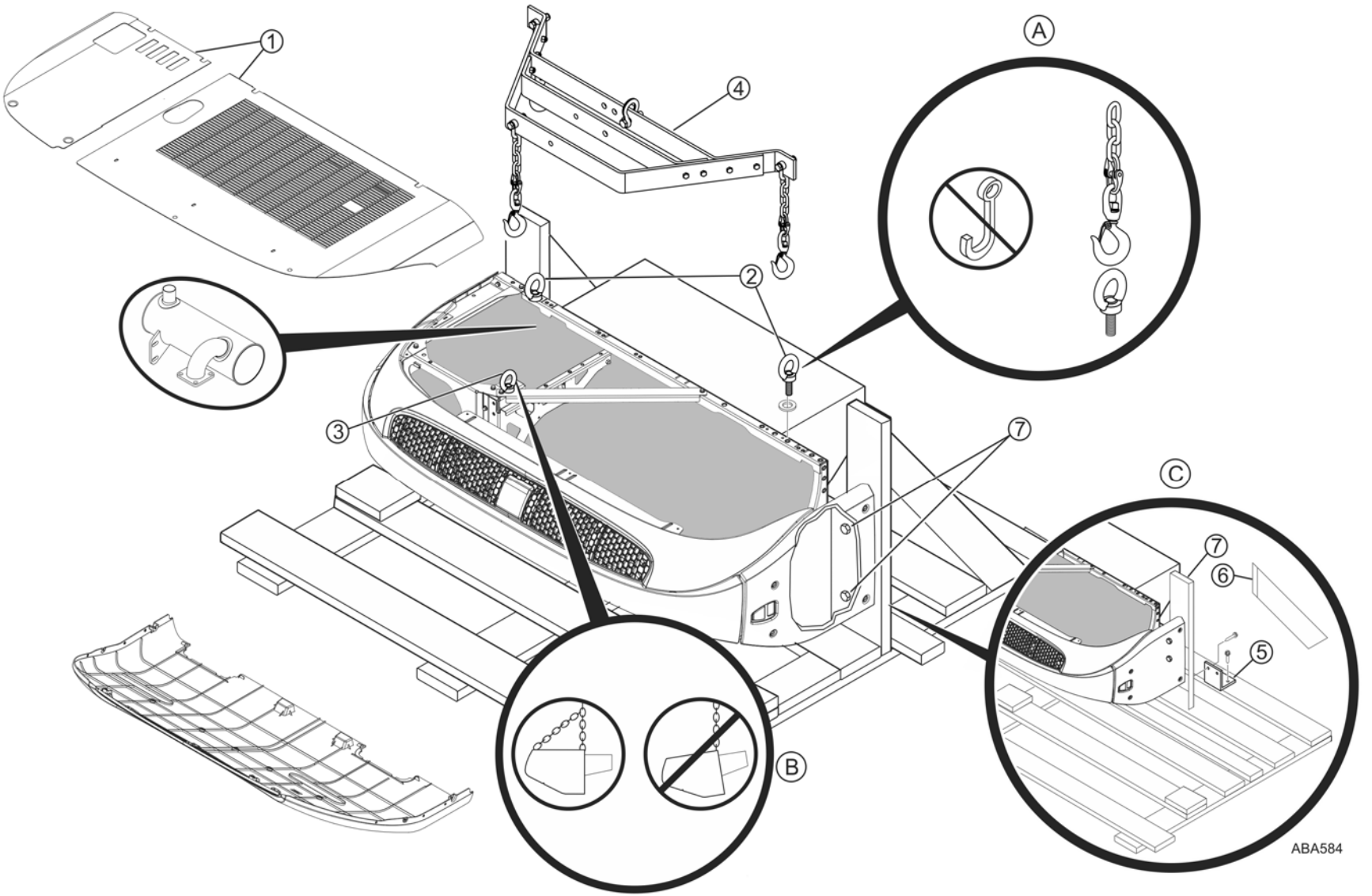
Uncrating the Unit

Carefully remove the top and side crate member and remove the bottom panel and installation kit components shipped with the unit.

1. Remove the top covers, top screen (if equipped) and the muffler from the unit.
2. Install two M12 eyebolts and washers into the lifting holes in the rear frame rails, and tighten securely. ***NOTE: M12 eyebolts must be used as M12 nuts are factory installed inside the rear frame channel.***
3. Install a third M12 eyebolt, washer and locking nut into the provided hole in the support channel as shown and tighten hardware securely.
4. Attach the new three point lifting bar securely to the three eyebolts and ***slightly*** raise the unit.
5. Remove the eight skid bracket screws securing the unit to the of the crate **(Detail C).**
6. Remove the two rear members of the crate and raise the unit from base approximately 304.8 mm (12.0 in.) **(Detail C).**
7. Remove the four mounting bolts securing the two upright members to the unit **(Detail C).**

The unit is now ready to install.

Uncrating the Unit



Installing the Unit

Important Unit Lifting Information

NOTE: All T-580 through T-1200 series truck units require a new lifting bar. This new bar must be used to safely lift and install these series units. This new bar must be used to safely lift and install these series units. See "Lifting Bar Details" on page 19.

WARNING: Thermo King requires a 3 point lifting bar to safely lift and install units. A lifting bar can be made from the drawings provided. See "Lifting Bar Details" on page 19.

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WARNING: Installer supplied lifting eyebolts must be forged steel, 12 mm, 1.75 pitch, minimum 20.5 mm long. Substitutions are not acceptable!

WARNING: Use only locking lifting hooks to attach to the lifting eyebolts (Detail A).

WARNING: The point shown in Detail B below is not a major lifting point. It is used only to level and balance the unit during installation (Detail B).

NOTE: The T-570R, T-600, T-600R, T-800, T-800R and T-1000 series truck units have dual mounting hole patterns in the frame.

- ***T-570R,*** *T-600, T-600R, T-600M, T-800 and T-800R use the lower dual mounting hole patterns.*
- *T-1000, T-1000R and T-1000M use the upper mounting hole patterns.*

Installing the unit

NOTE: The muffler must not be installed before mounting the unit.

1. Use the new 3 point lifting bar to carefully lift the unit up to the truck opening.
2. Install four M12 (1/2-13 in. Grade 5) mounting bolts through the wall of the truck box.

NOTE: The mounting bolts should protrude 73.3 mm (2.90 in.) full thread from the front wall of the cargo box (Detail B). Carefully slide the unit into the opening and over mounting bolts.

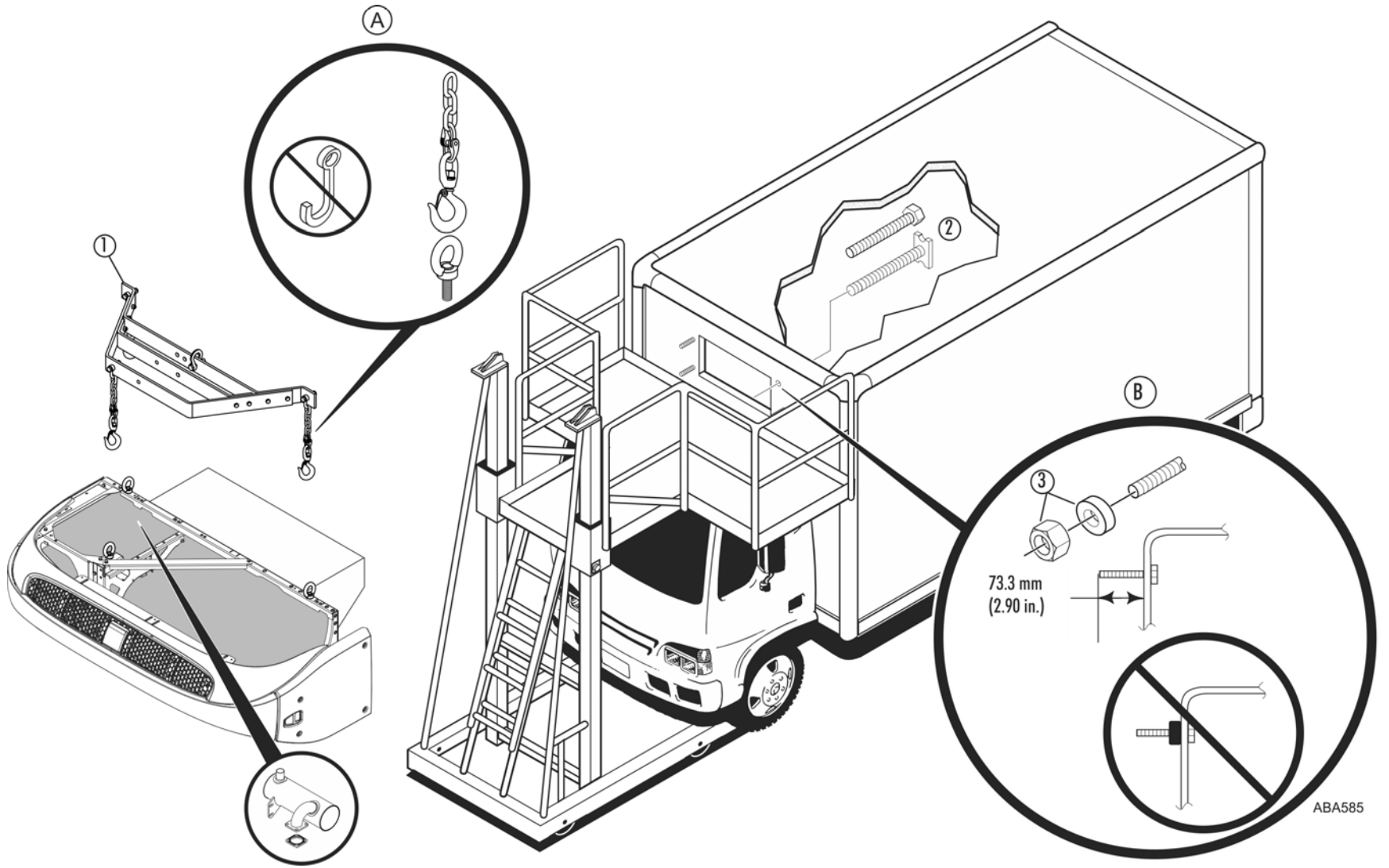
IMPORTANT: DO NOT INSTALL ANY COMPRESSIBLE WASHERS OR OTHER MATERIALS BETWEEN THE UNIT AND THE TRUCK!

3. On the inside of the unit frame, install the four 4.8 mm (0.188 in.) mounting washers and the locking nuts provided in the installation kit.
   - Torque the mounting hardware to 81.4 N•m (60 ft. lbs.).
   - Disconnect and remove the lifting bar.

NOTE: Depending on your particular installation, excess threads of the upper roadside unit mounting bolt may need to be cut off to prevent interference with the muffler.

4. Reinstall the muffler and the new gasket supplied in kit onto the engine.
   - Torque the muffler mounting bolts to 18.4 N•m (13.6 ft. lbs).
   - Install the exhaust pipe onto the muffler and tighten securely.
5. Remove and save the three M12 eyebolts installed earlier.
6. Reinstall the top cover or screen (if applicable) securely.
7. Install the bottom pan securely using the supplied M6 Torx head mounting hardware.

Installing the Unit



Installing the Hose Management Caps

Hose Management Caps (STANDARD)

Hose management caps provide a exit point under each side of the unit for routing the individual drain hoses, fuel lines, electrical cables. The caps are provided with cutout guide marks. Always remove any sharp edges after cutting the caps.

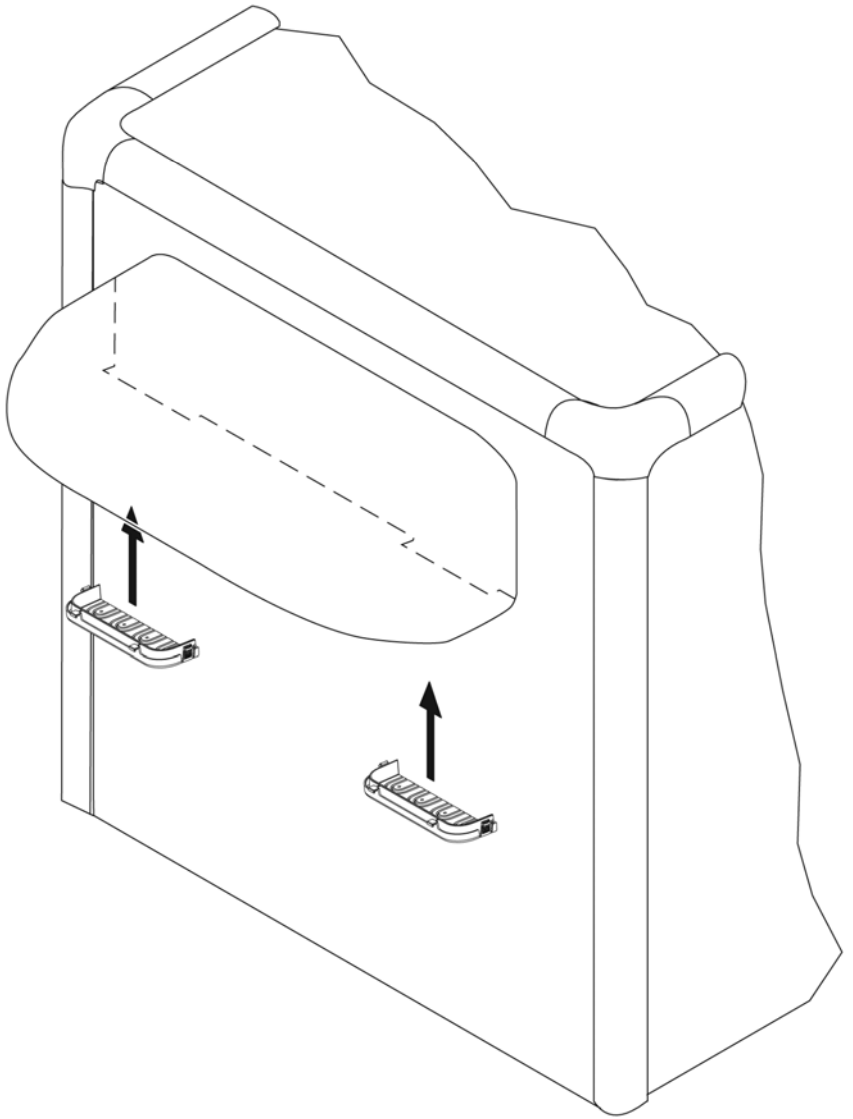
Roadside Cap

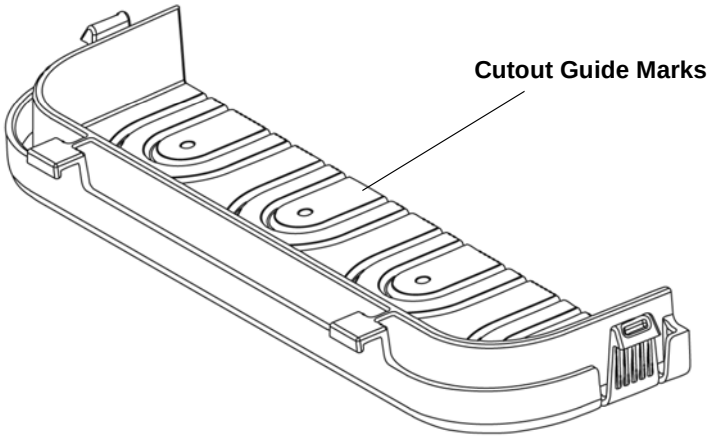
1. Route the following items out of the roadside cutout of the bottom pan and down the front exterior wall of the cargo box:
   - Roadside Evaporator Drain Hose
   - In-Cab Controller Harness
   - Remote Receptacle Power Cable (Model 50 Units Only)

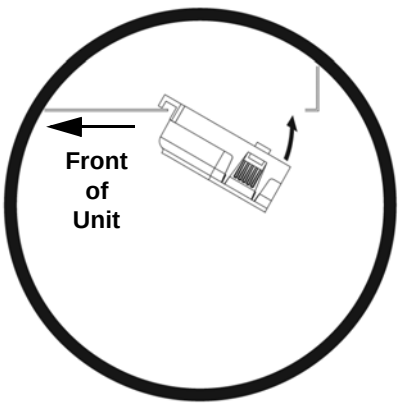
Curbside Cap

2. Route the following items out of the curbside cutout of the bottom pan and down the front exterior wall of the cargo box:
   - Curbside Evaporator Drain Hose
   - Coolant Overflow Hoses (2)
   - Fuel Supply and Return Lines (2)
   - Positive and Negative Battery Cables (2)
   - Unit Control Power Wire
   - Fuel Pump Harness
   - Oil Drain Hose (See “Securing the Oil Drain Hose” on page 34).
3. Trim the cutout areas on the caps as required.
4. Install each cap securely into the bottom pan.

Installing the Hose Management Caps







ARD549

Installing the Hose Management System (OPTION)

Hose Management System (OPTION)

The hose management system organizes the routing of the drain hoses, electrical cables and fuel lines down the truck wall. White plastic covers protect these components from damage while providing a cleaner, finished installation.

The kit consists of a funnel cap, clip assemblies, straight covers and mounting hardware. Additional kits with offset covers are also available.

IMPORTANT: See "Securing the Oil Drain Hose" on page 34.

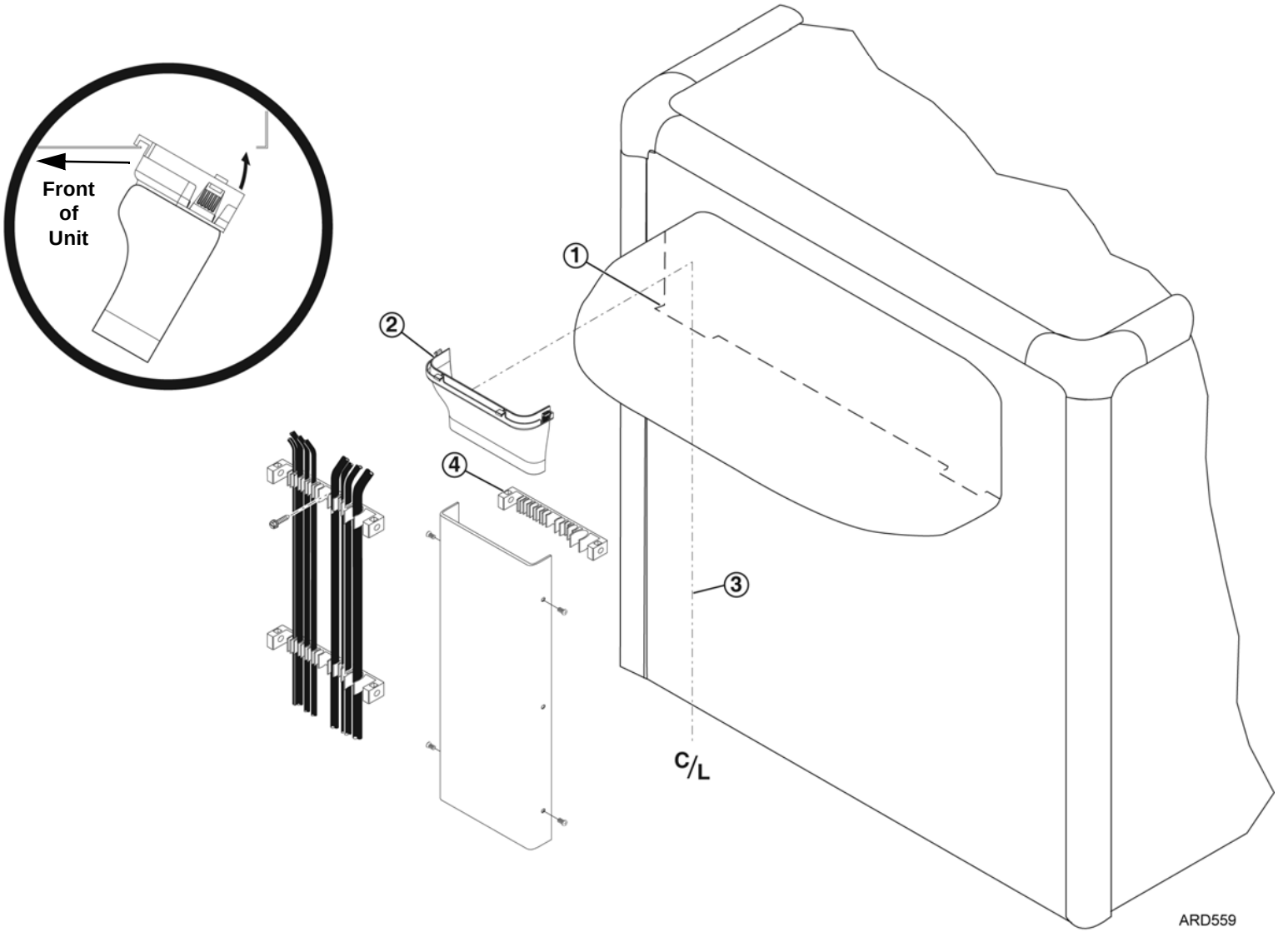
1. Route the following items out of the curbside cutout of the bottom pan and down the front exterior wall of the cargo box:
    - Curbside Evaporator Drain Hose
    - Engine Overflow Hose
    - Fuel Supply and Return Lines
    - Positive Battery Cable
    - Unit Control #2 Power Wire
    - Fuel Pump Harness
    - Negative Battery Cable
2. Install the funnel cap into the bottom pan securely.
3. Mark a line from the center of the funnel cap down the truck box wall.
4. Install two clip assemblies onto each cover with supplied hardware.
    - Insure the surface area of the truck box is clean, flat and uniform.
    - Clean the surface area thoroughly with 50:50 mixture of isopropyl and water.
    - Peel the backing off the adhesive strips. Using the center line, position the covers and press firmly into position.
    - Remove the covers from the clips.

NOTE: If adequate bond was not possible, attach the clips securely with self-drilling screws.

5. Route and install the hoses and cables in the clips as shown.
6. Reinstall the covers securely.
7. Installation on the roadside is similar.

NOTE: For 50 Models ONLY. Route the standby power cable down the center of the clip assemblies.

Installing the Hose Management System (OPTION)

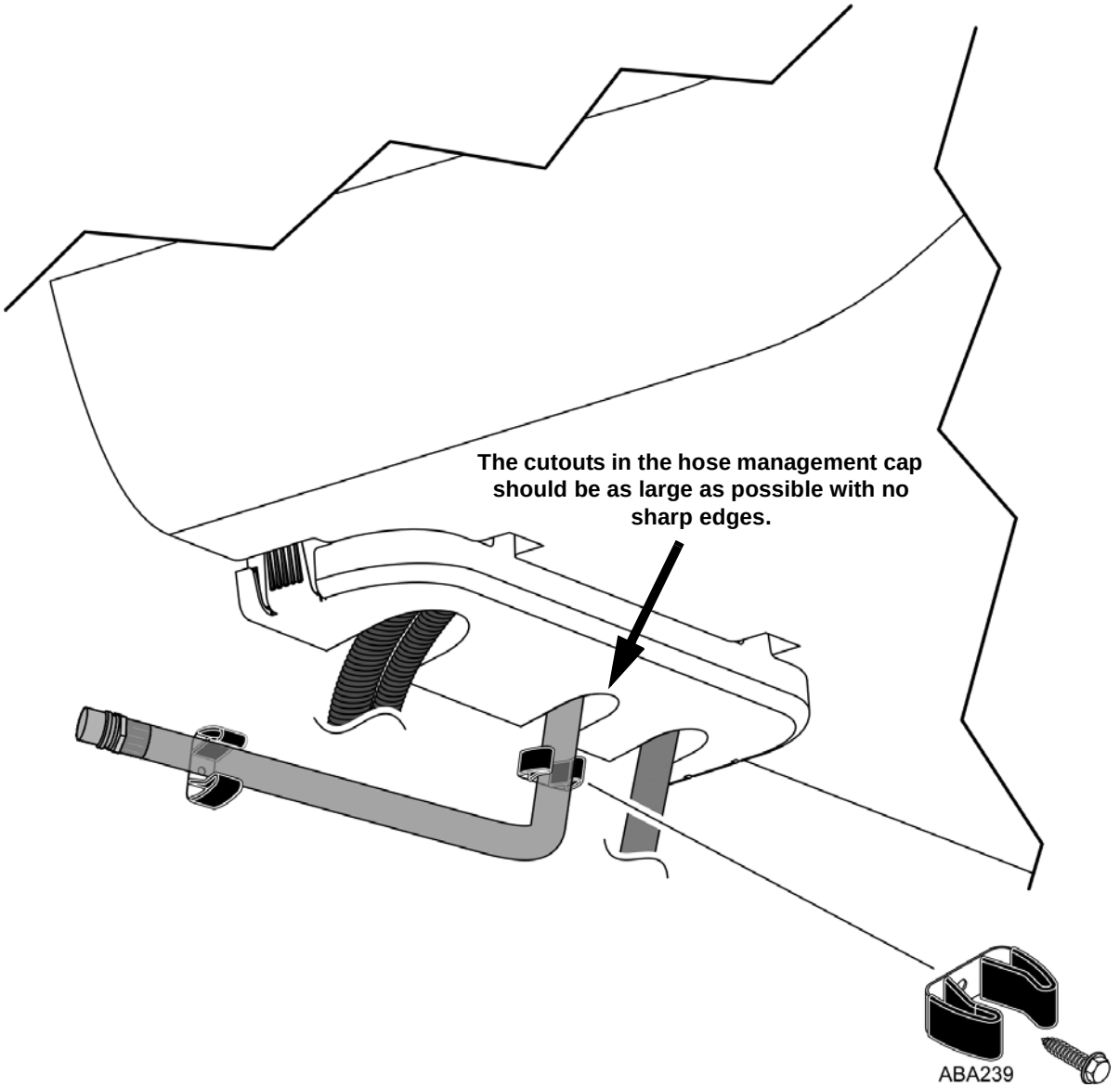


Securing the Oil Drain Hose

Oil Drain Hose

1. Secure the oil drain hose directly under the unit to the cargo box with the two supplied retaining clips and self tapping screws as shown.
2. Ensure there is no contact and adequate clearance between the oil drain hose and the hose management caps. The cutout in the hose management cap should be as large as possible with no sharp edges.
3. Lower retaining clip should be positioned in an location easily accessible for servicing the unit. Your actual location will depend on the distance between the bottom of unit to top of cab, etc.

Securing the Oil Drain Hose

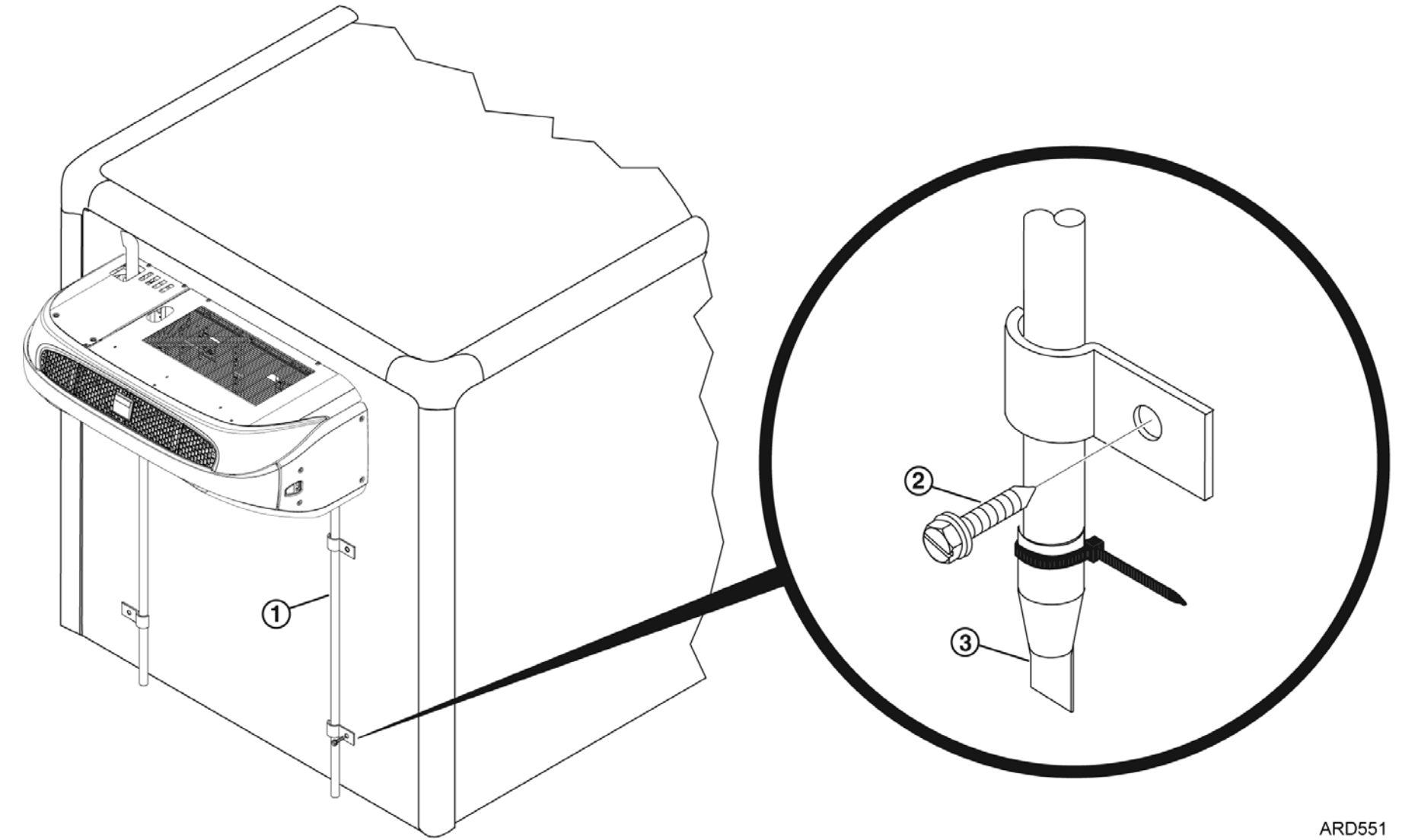


Securing the Evaporator Drain Hoses

IMPORTANT: Evaporator drain hoses must be installed without any sharp bends or kinks to allow for proper water drainage.

1. Route drain hoses from under the unit, through the Hose Management Caps and down the front wall of the truck box.
2. Secure drain hoses with supplied self tapping screws and clamps.
3. Cut off excess drain hose and install a check valve onto each drain hose securely with tie bands.

Securing the Evaporator Drain Hoses



Installing the Fuel Pickup Tube Into a Steel or Aluminum Tank

NOTE: The fuel pickup tube supplied in the installation kit will not be needed when installing an optional Thermo King aluminum fuel tank. The aluminum tank is already equipped with fuel inlet, fuel outlet and vent fittings.

DANGER: Diesel fuel vapors are potentially explosive. Use extreme caution when drilling in or around the diesel fuel tank. Sparks from an electric drill or drill bit could cause an explosion. Do not smoke while working near the diesel fuel tank. Drain all diesel fuel from the tank and use nitrogen or an inert gas to purge the diesel fuel vapors from the tank prior to drilling. Keep the diesel tank filled with inert gas while drilling.

1. Tape the paper template (supplied with pickup tube) to the desired location on the diesel fuel tank and center punch the three holes.

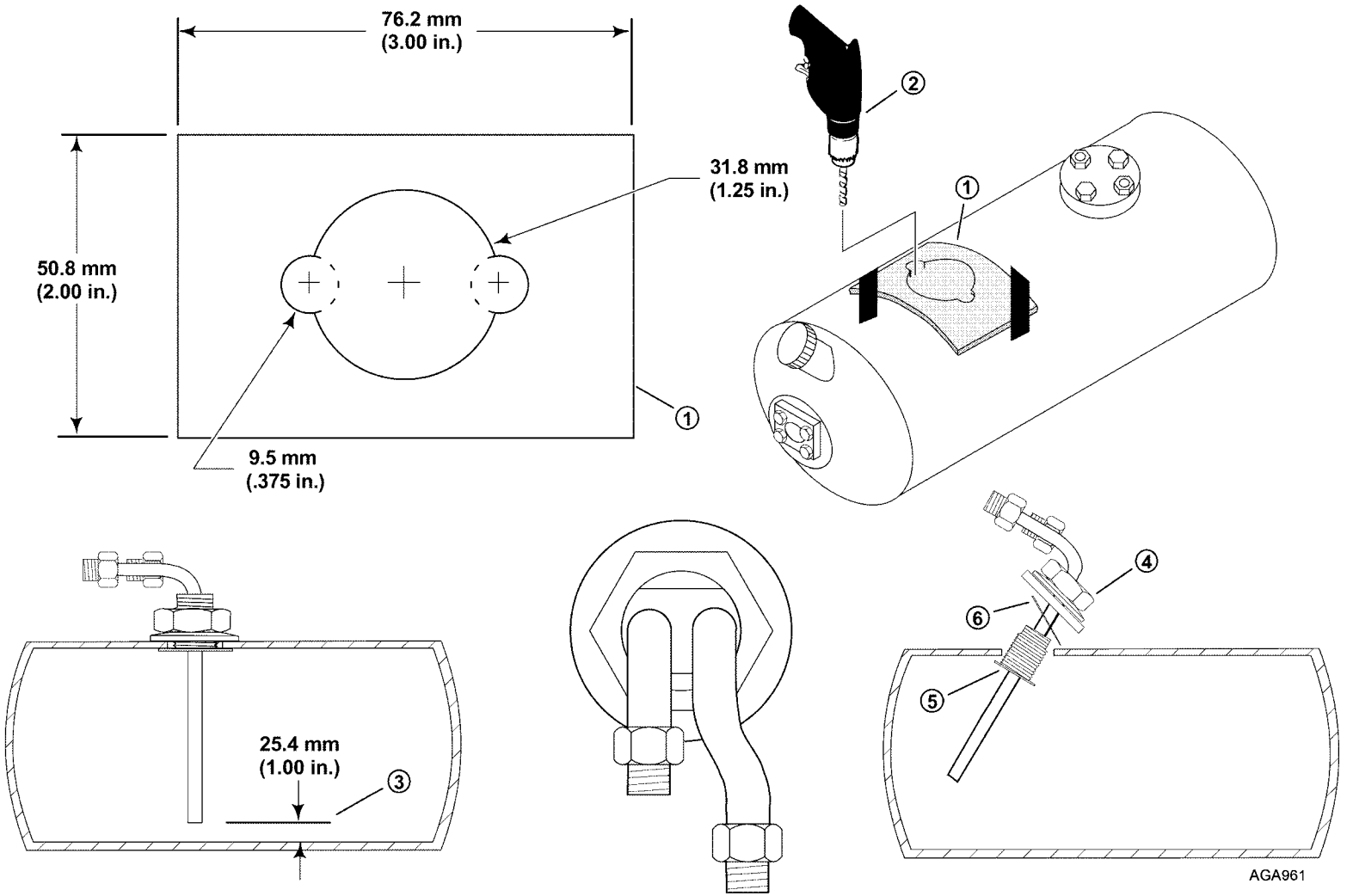
   NOTE: Use a magnet, grease or special hole saws/drills that will minimize metal or aluminum chips from entering the fuel tank. Thoroughly clean and flush the tank to remove any chips.

2. Drill:

   - 9.5 mm (0.375 in.) diameter holes first.
   - 31.8 mm (1.250 in.) diameter hole next.
   - Remove the template from the tank and remove any burrs from the hole.

3. Cut the end of the pickup tube so approximately 25 mm (1.00 in.) is above the bottom of the fuel tank.
4. Loosen the nut and slide all the parts to the top of the pickup tube assembly.
5. Hold the parts in position and slide the assembly into the hole at a slight angle until the bushing is inside the hole.
6. Tip the backup washer and slide it through the hole and position it onto the bushing. Thread the nut onto the bushing, position as needed to facilitate fuel line connections and tighten to 54 Nm. (40 ft-lb.).

Installing the Fuel Pickup Tube Into a Steel or Aluminum Tank



Installing the Fuel Pickup Tube Into a Plastic Tank

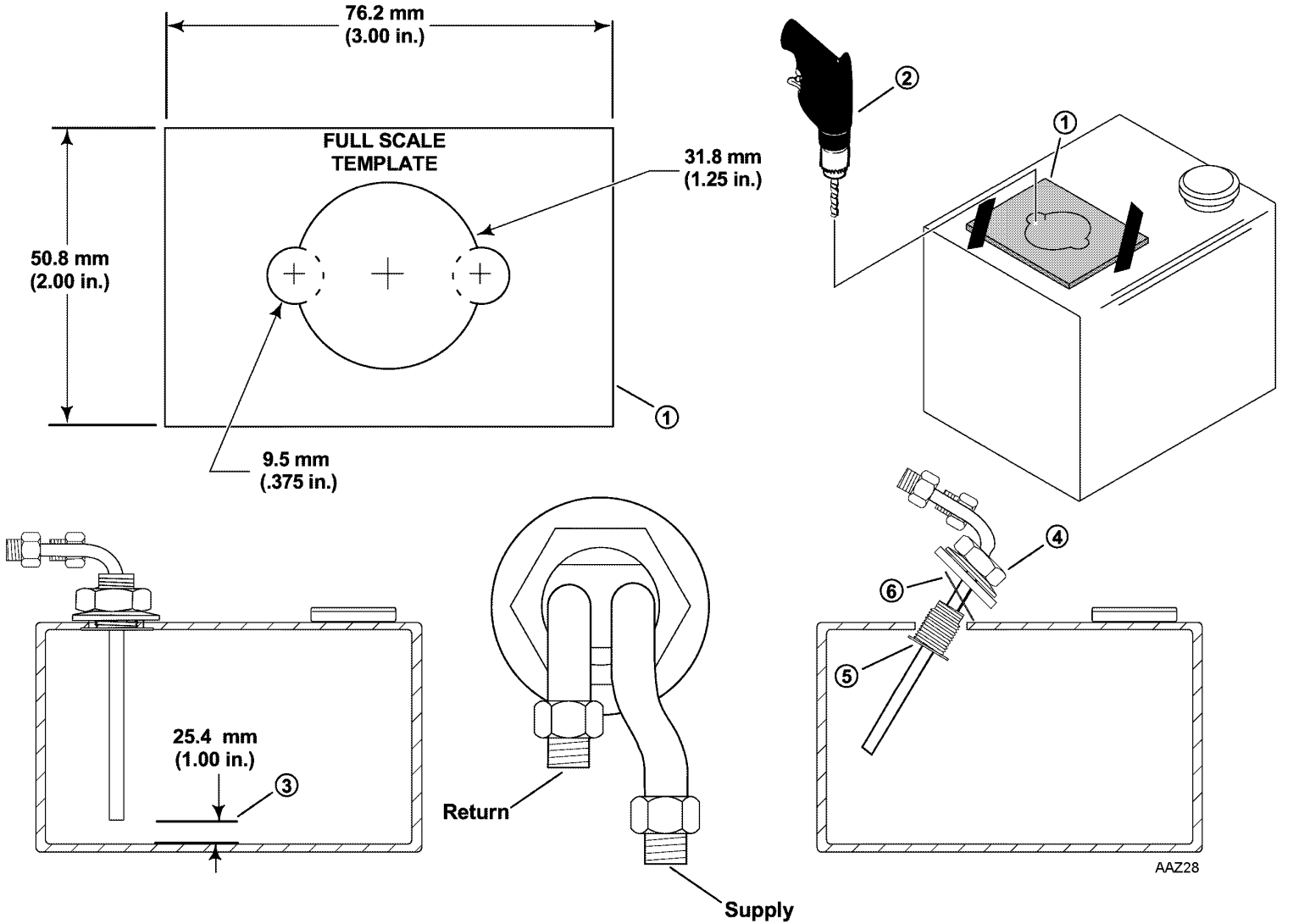
DANGER: Diesel fuel vapors are potentially explosive. Use extreme caution when drilling in or around the diesel fuel tank. Sparks from an electric drill or drill bit could cause an explosion. Do not smoke while working near the diesel fuel tank. Drain all diesel fuel from the tank and use nitrogen or an inert gas to purge the diesel fuel vapors from the tank prior to drilling. Keep the diesel tank filled with inert gas while drilling.

1. Tape the paper template (supplied with pickup tube) to the desired location on the diesel fuel tank and center punch the three holes.

   NOTE: Use grease or special hole saws/drills that will minimize plastic chips from entering the fuel tank Thoroughly clean and flush the tank to remove any chips.

2. Drill:
   - 9.5 mm (0.375 in.) diameter holes first.
   - 31.8 mm (1.250 in.) diameter hole next.
   - Remove the template from the tank and remove any burrs from the hole.
3. Cut the end of the pickup tube so approximately 25 mm (1.00 in.) is above the bottom of the fuel tank.
4. Loosen the nut and slide all the parts to the top of the pickup tube assembly.
5. Hold the parts in position and slide the assembly into the hole at a slight angle until the bushing is inside the hole.
6. Tip the backup washer and slide it through the hole and position it onto the bushing. Thread the nut onto the bushing, position as needed to facilitate fuel line connections and tighten to 54 Nm. (40 ft-lb.).

Installing the Fuel Pickup Tube Into a Plastic Tank



Installing the Steel Fuel Tank

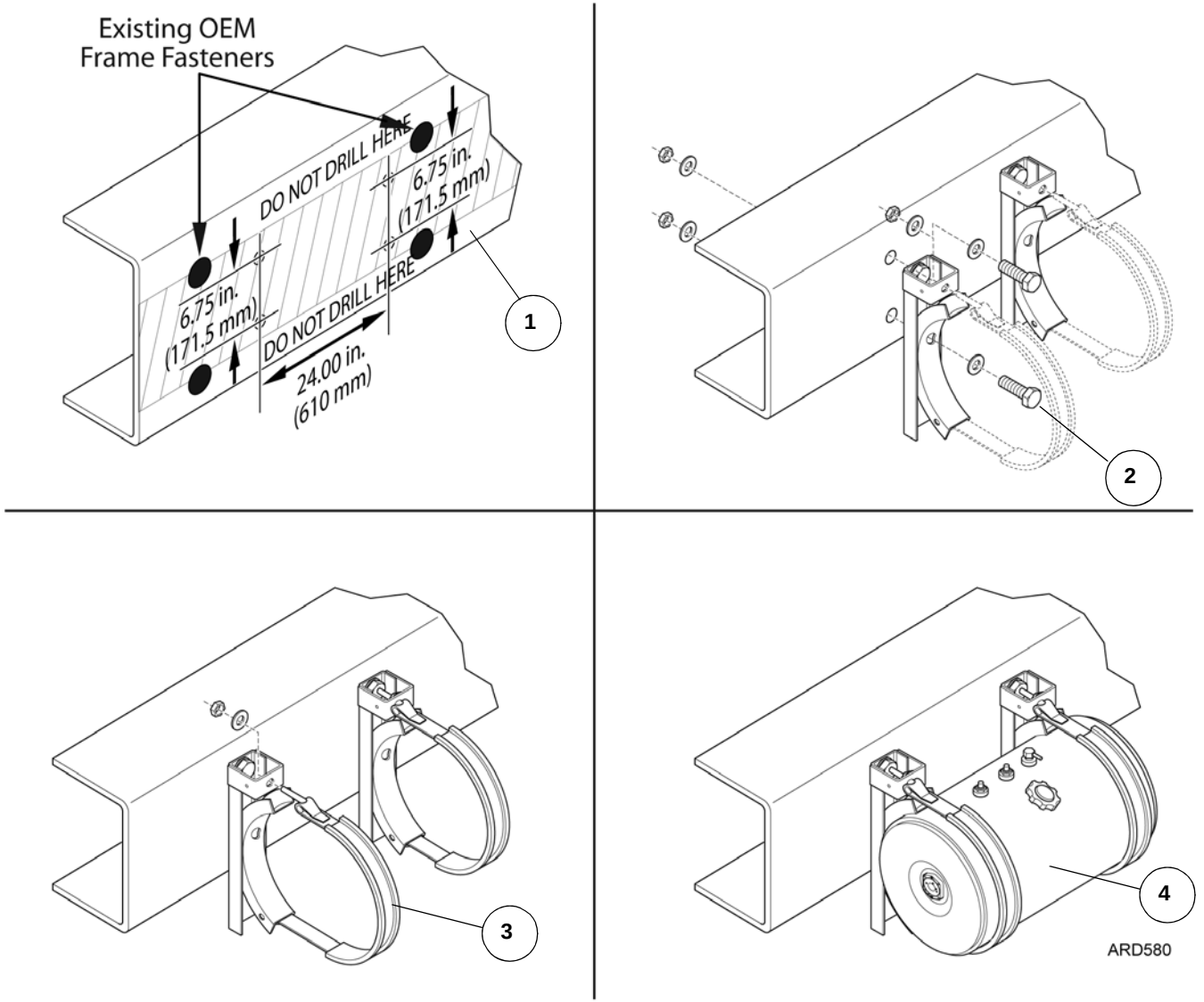
DANGER: An improperly installed fuel tank could lead to serious injury or death! Consult your truck's chassis manufacturer for specific details on proper fuel tank installation and recommendations.

IMPORTANT: Observe the positioning of existing OEM fasteners on the vehicle frame. The four fasteners used to install the fuel tank brackets must be located on the frame no higher and no lower than any existing OEM fasteners.

1. The fuel tank mounting brackets should be positioned 610 mm (24.00 in.) apart to properly support the combined weight of 118 kg (260 lbs.) which includes the fuel tank, mounting brackets and 30 gallons of diesel fuel.
   - Measure and mark the location of the four mounting holes on the frame.
   - Use a 17 mm (11/16 in.) drill bit and drill four holes in the frame.
2. Install each fuel tank mounting bracket securely onto the truck's frame with two, 1/2 -13, Grade 5 bolts, flat washers and locking nuts. ***Substitutions are not acceptable!***
   - Torque the bolts to 81-88 N•m (60-65 ft-lb.).
3. Install the mounting bands T-bolts onto the mounting brackets with flat washers and locking nuts.
4. Install the fuel tank into the mounting bands.
   - Torque the upper mounting band T-bolts to 47 N•m (35 ft-lb.).

IMPORTANT: Do not over tighten the mounting band bolts or damage to the bands will result!

Installing the Steel Fuel Tank



Installing the Aluminum Fuel Tank (OPTION)

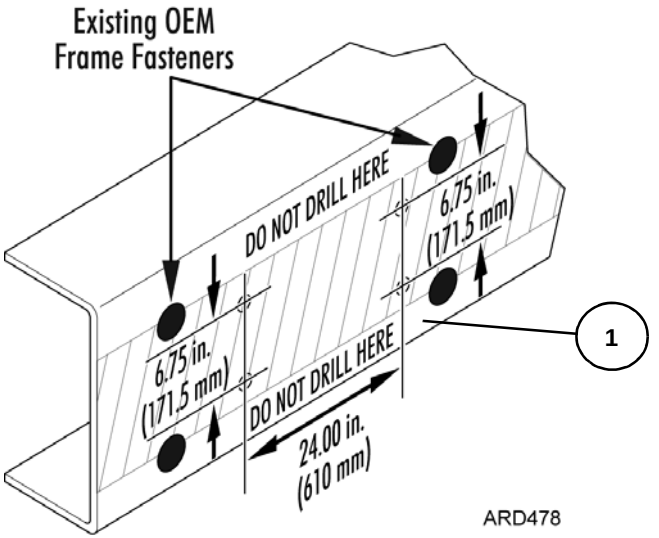
DANGER: An improperly installed fuel tank could lead to serious injury or death! Consult your truck's chassis manufacturer for specific details on proper fuel tank installation and recommendations.

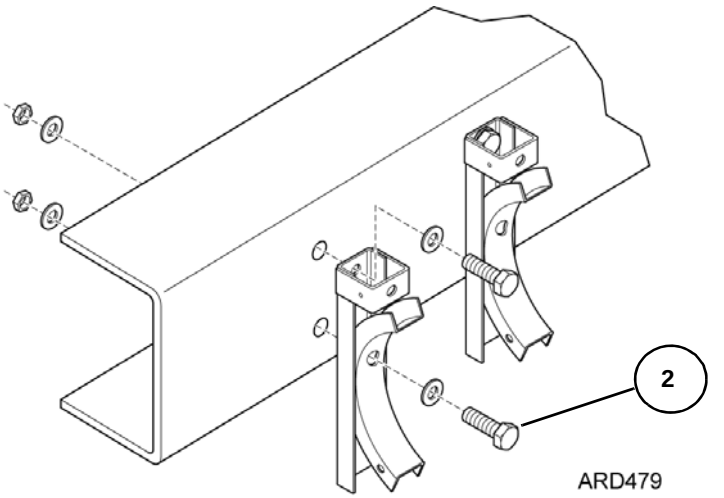
IMPORTANT: Observe the positioning of existing OEM fasteners on the vehicle frame. The four fasteners used to install the fuel tank brackets must be located on the frame no higher and no lower than any existing OEM fasteners.

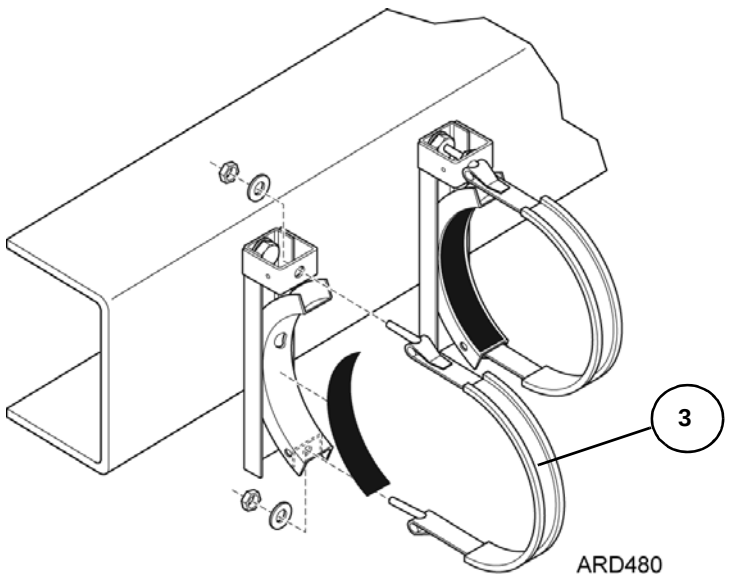
1. The fuel tank mounting brackets should be positioned 610 mm (24.00 in.) apart to properly support the combined weight of 118 kg (260 lbs.) which includes the fuel tank, mounting brackets and 30 gallons of diesel fuel.
   - Measure and mark the location of the four mounting holes on the frame.
   - Use a 17 mm (11/16 in.) drill bit and drill four holes in the frame.
2. Install each fuel tank mounting bracket securely onto the truck's frame with two, 1/2 -13, Grade 5 bolts, flat washers and locking nuts. ***Substitutions are not acceptable!***
   - Torque the bolts to 81-88 N•m (60-65 ft-lb.).
3. Install the mounting bands onto the mounting brackets with flat washers and locking nuts.
   - Tighten only the lower T-bolt to 47 N•m (35 ft-lb.).
   - Install the self-adhesive rubber strips onto each mounting bracket as shown.
4. Install the fuel tank into the mounting bands.
   - Confirm the rubber strips on both the mounting bands and the mounting brackets are positioned correctly to prevent metal to aluminum contact.
   - Torque the upper mounting band T-bolts to 47 N•m (35 ft-lb.).

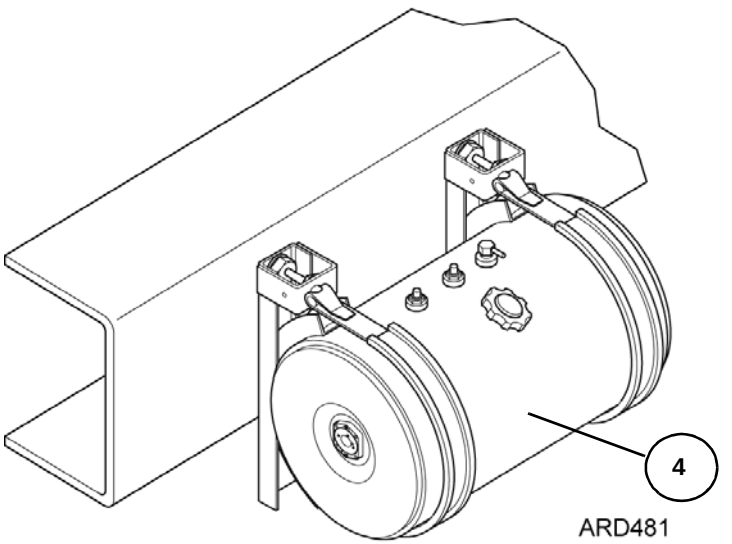
IMPORTANT: Do not over tighten the mounting band bolts or damage to the bands will result!

Installing the Aluminum Fuel Tank (OPTION)









Installing the Fuel Pump and Fuel Lines

DANGER: The Thermo King fuel pump should be installed onto the supplied mounting bracket. The fuel pump and fuel lines should be installed a safe distance away from the extreme heat generated by the Diesel Particulate Filter (DPF) or exhaust system components on the truck. Failure to do so could result in damage to equipment or fire!

DANGER: Leaking fuel lines could cause a fire resulting in death or serious injury All fuel lines must be tight and leak free!

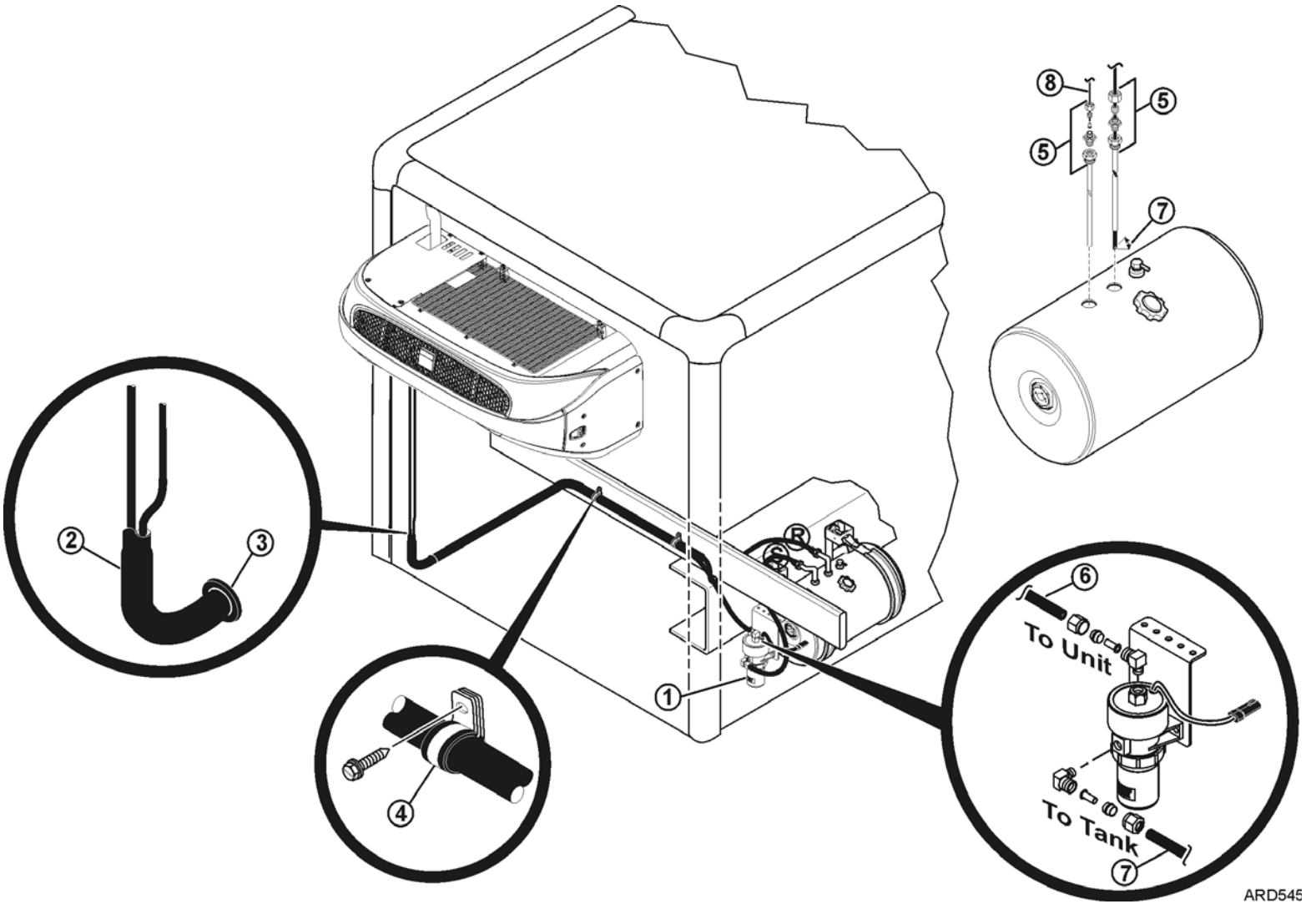
DANGER: Do not route fuel lines with battery cables or electrical wires, as this could cause a fire!

NOTE: Do not connect unit fuel lines into any truck/trailer fuel lines.

S=Supply R=Return

1. The fuel pump must be installed as close to the fuel tank as possible and not more than 762 mm (30.00 in.) above the fuel in the fuel tank.
2. Fuel lines should be routed in a protective housing with no kinks or sharp bends.
3. Rubber grommets must be used when routing fuel lines through sheet metal.
4. Secure all fuel lines with provided clamps.
5. Remove the protective plugs from each of the fuel pick up tubes on the fuel tank and install fuel line fittings.
6. From the unit, route and install the **fuel supply** line to the upper fuel line fitting on the fuel pump. Tighten the fuel line fittings securely.
7. From the fuel pump, route the lower **fuel supply** line to the fuel tank.
   - Cut the end of the nylon fuel supply line at a 45 degree angle and insert into one of the fuel line fittings.
   - Feed the fuel line down into the tank until it hits bottom, then pull it back up 25 mm (1.00 in.) and tighten the fuel line fitting securely.
8. From the unit, route the **fuel return** line to the fuel tank.
   - Insert the fuel return line into the other fuel line fitting and tighten the fuel line fitting securely.
9. Remove the plastic cap from the fuel vent and point the outlet towards the rear of the truck.
10. Operate the unit and check all fuel line fittings for fuel leaks.

Installing the Fuel Pump and Fuel Lines

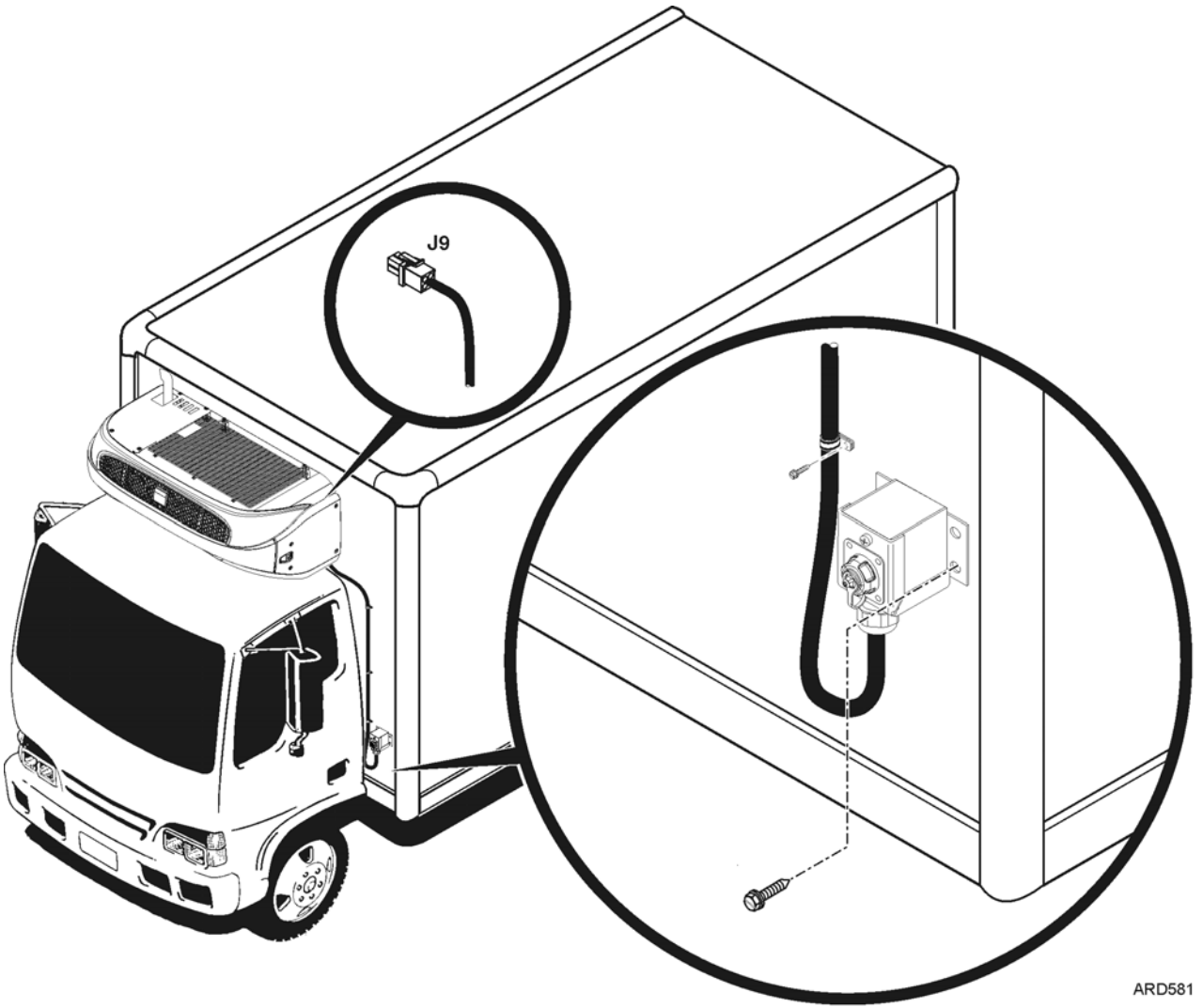


Installing the ServiceWatch™ Remote Download Port (OPTION)

Choose an appropriate location to mount the ServiceWatch port that provides for safe and easy access for connecting the download cable. The download port can be rotated to fit your particular installation.

1. Attach the download port securely to the truck box with four TEK screws.
2. Provide a drip loop and secure the harness with supplied clamps and screws.

Installing the ServiceWatch™ Remote Download Port



Installing the Remote Power Receptacle (OPTION)

DANGER: To prevent serious injury or death, the electric standby power cord must not be connected to the unit during installation!

Choose an appropriate location to mount the power receptacle that provides for safe and easy access for connecting the power cord.

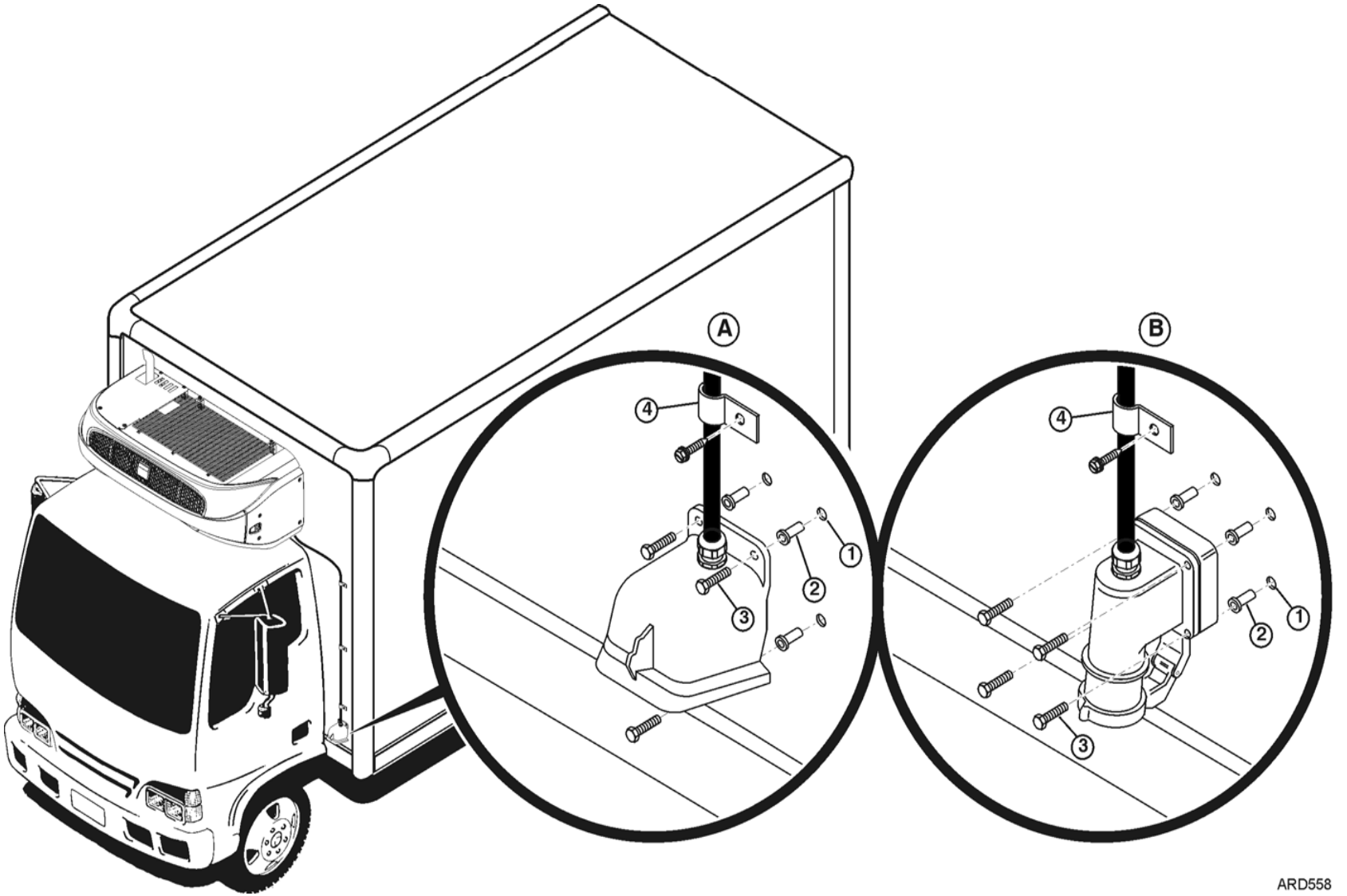
North American Units (Detail A)

1. Measure and drill three 13 mm (.500 in.) holes into truck body.
2. Insert the supplied rubber blind nuts into each hole in truck body.
3. Install the receptacle to the truck box with the supplied 1/4 x 20 mounting hardware and tighten securely.
4. Route and secure the harness with supplied clamps and screws.

International Units (Detail B)

1. Measure and drill four 9.5 mm (.375 in.) holes into truck body
2. Insert the supplied rubber blind nuts into each hole in truck body.
3. Install the receptacle to the truck box with the supplied 10-32 mounting hardware and tighten securely.
4. Route and secure the harness with supplied clamps and screws.

Installing the Remote Power Receptacle (OPTION)

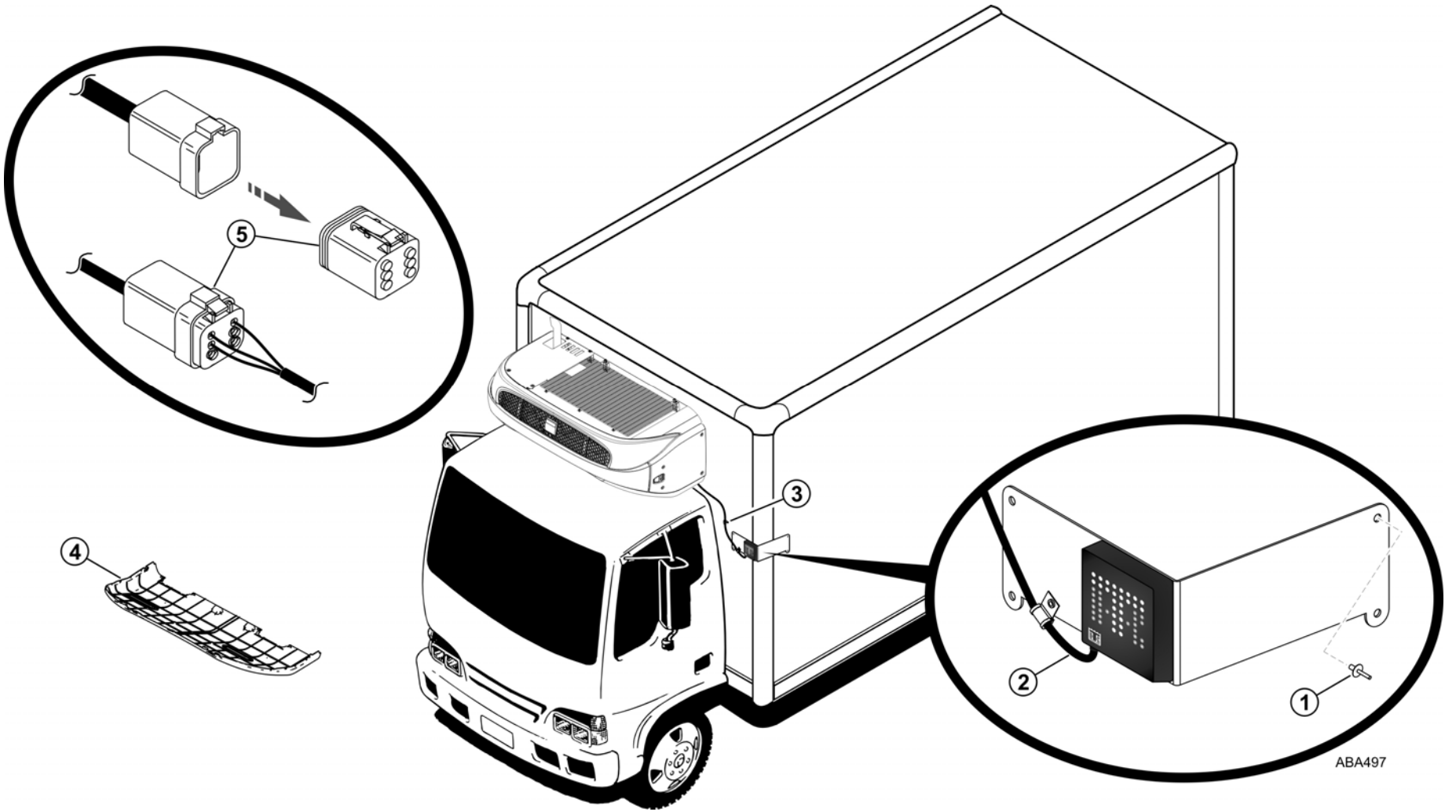


Installing the Remote Status Light (OPTION)

Installation

1. Mount the Status Light in a location so that is visible to the driver in the truck’s mirror.
   - Mark and drill the four mounting holes using a 3/16" drill.
   - Mount the status light securely with the supplied rivets.
2. Provide a “drip-loop” to prevent water from migrating into the Status Light and route the harness towards the bottom of the unit.
3. Secure harness to the truck box using the supplied clamps and rivets.
4. Remove the bottom pan from the unit and locate the 6-pin connector under the unit near the control box.
5. Remove the blank plug and attach the Status Light connector securely.
6. Secure excess harness up under the control box with band wraps.
7. Reinstall bottom pan.

Installing the Remote Status Light (OPTION)



Installing the HMI Controller

NOTE: Route and secure the controller harness to prevent rubbing, chafing or making contact with sharp, moving or hot components. Allow excess harness for tilt cab applications. The supplied rubber grommets must be used when routing harness through sheet metal holes.

Inside Cab DIN Mounting

1. Install DIN (ISO 7736) mounting sleeve into driver panel DIN opening. Bend the mounting sleeve tabs to secure.
2. Route the controller harness from the unit to inside the cab and through the mounting sleeve.

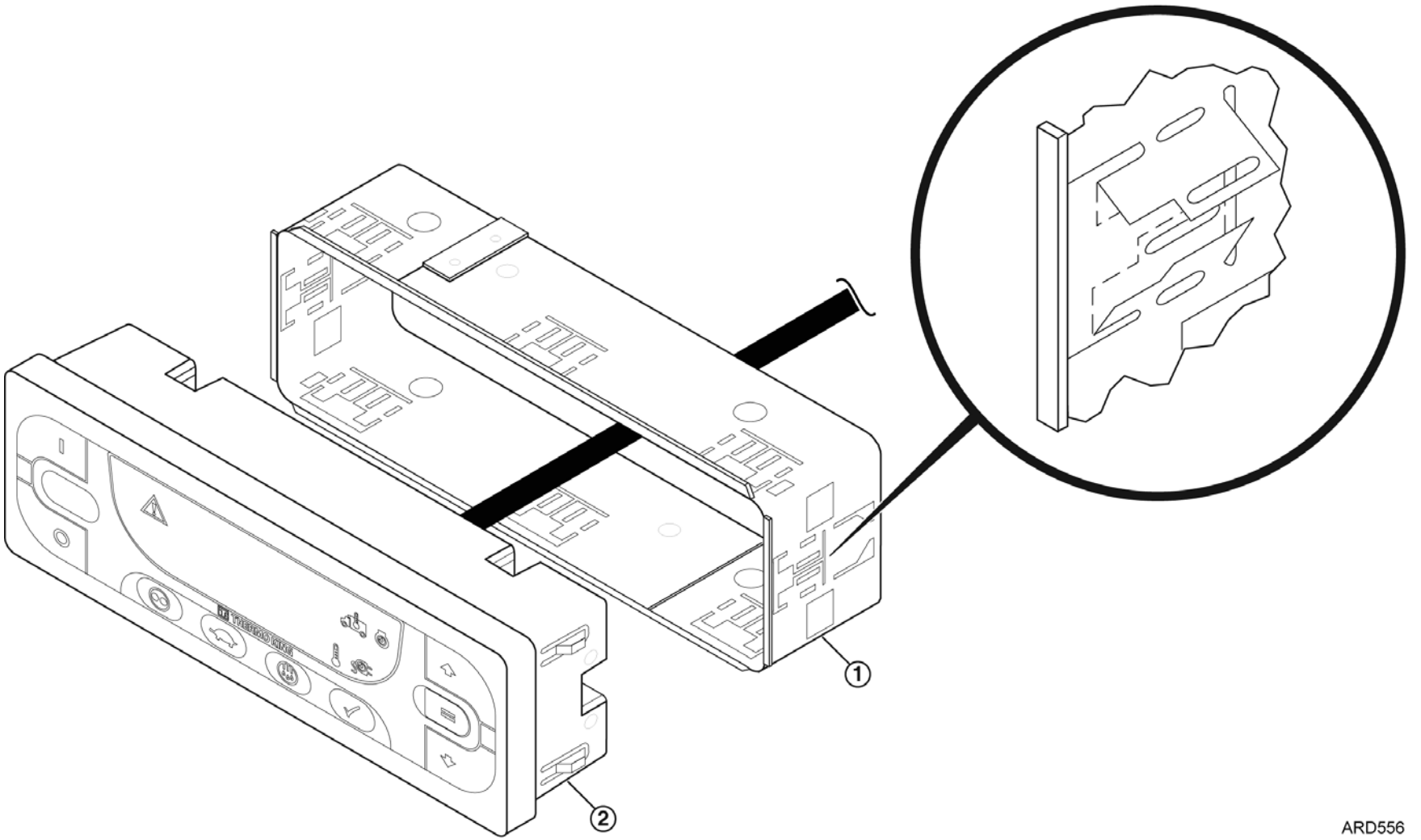
HMI Controller (LED Display) - Insert the controller harness to the mating connector at the rear of the HMI controller until it locks firmly in position.

- Lightly pull on the harness to confirm the harness is locked securely.
- Install the plug cover onto the rear of the controller with the two supplied screws.

HMI Controller (Graphics Display) - Install the harness plug cover onto the rear of the controller with the four supplied screws.

3. Install the HMI controller into mounting sleeve until it locks in position.

Installing the HMI Controller



NOTE: HMI with LED Display shown, HMI with Graphics Display installs the same.

Installing the Battery Box (OPTION)

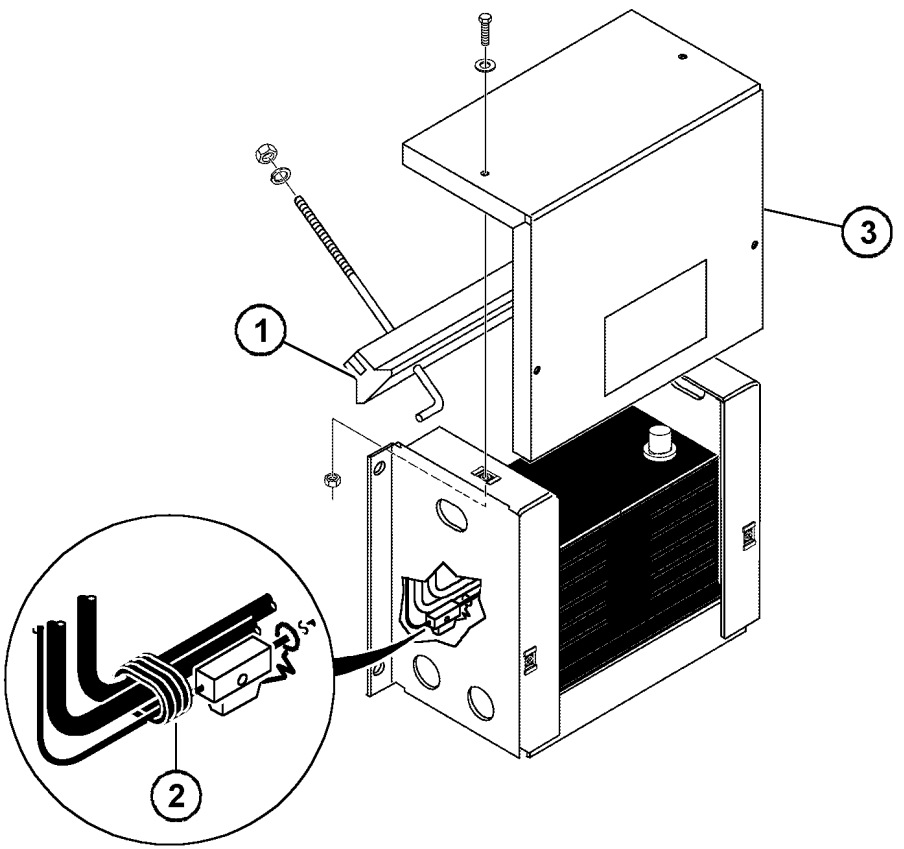
CAUTION: Battery boxes and covers must be installed securely with proper hardware to prevent them from falling off.

CAUTION: Battery cables must be properly routed and secure to prevent rubbing, chafing or making contact with sharp, moving or hot components.

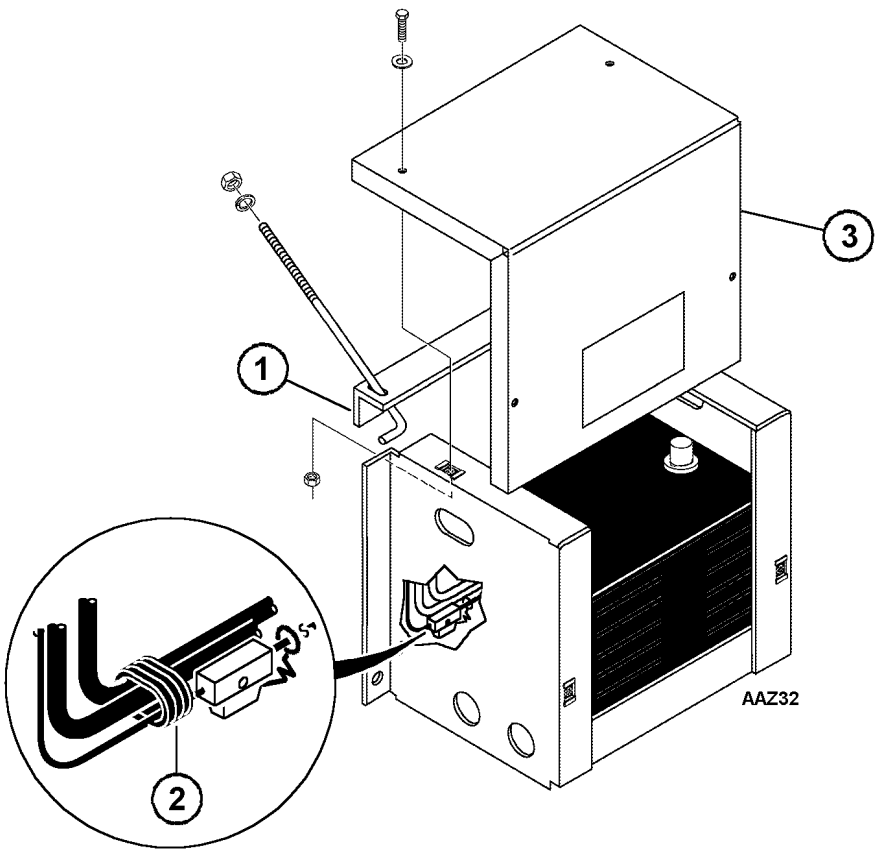
1. Secure battery in place with hold down bracket and rod.
2. Rubber grommets must be used where cables and fuse holder enter box.
3. ***DO NOT*** install protective battery cover. This will be installed later.

Installing the Battery Box (OPTION)

INTERNATIONAL MODELS



NORTH AMERICAN MODELS



Battery Connections

Important Battery Information

IMPORTANT: See Safety Precautions - "Battery Installation and Cable Routing" on page 7 for additional information.

NOTE: Thermo King units are designed for one 12 volt, group 31 battery. The battery must be suitable for deep cycling, heavy duty and rated with a minimum of 95 amp/hr.

Positive Cable

1. At the unit, locate the large black cable marked **POS+**. Route this cable to the battery, cut to the proper length and add battery cable lug from installation kit **(Detail A)**. This cable will be attached to the battery in Step 2.

Unit Control Power Wire

2. At the unit, locate the large 8 AWG **(#2)** wire. Route this wire to the battery, cut to the proper length and add fuse holder assembly.
   - Use battery cable crimper to securely crimp 8 AWG (#2) wire and fuse holder together and heat shrink the connection.
   - Apply a liberal amount of Superlube to the 60 amp fuse and fuse holder and then install fuse.
   - Route the fuse holder terminal along with the positive cable **(POS+)** into the battery box through the rubber grommet and connect to the **POSITIVE** terminal of the battery **(Detail A)**.

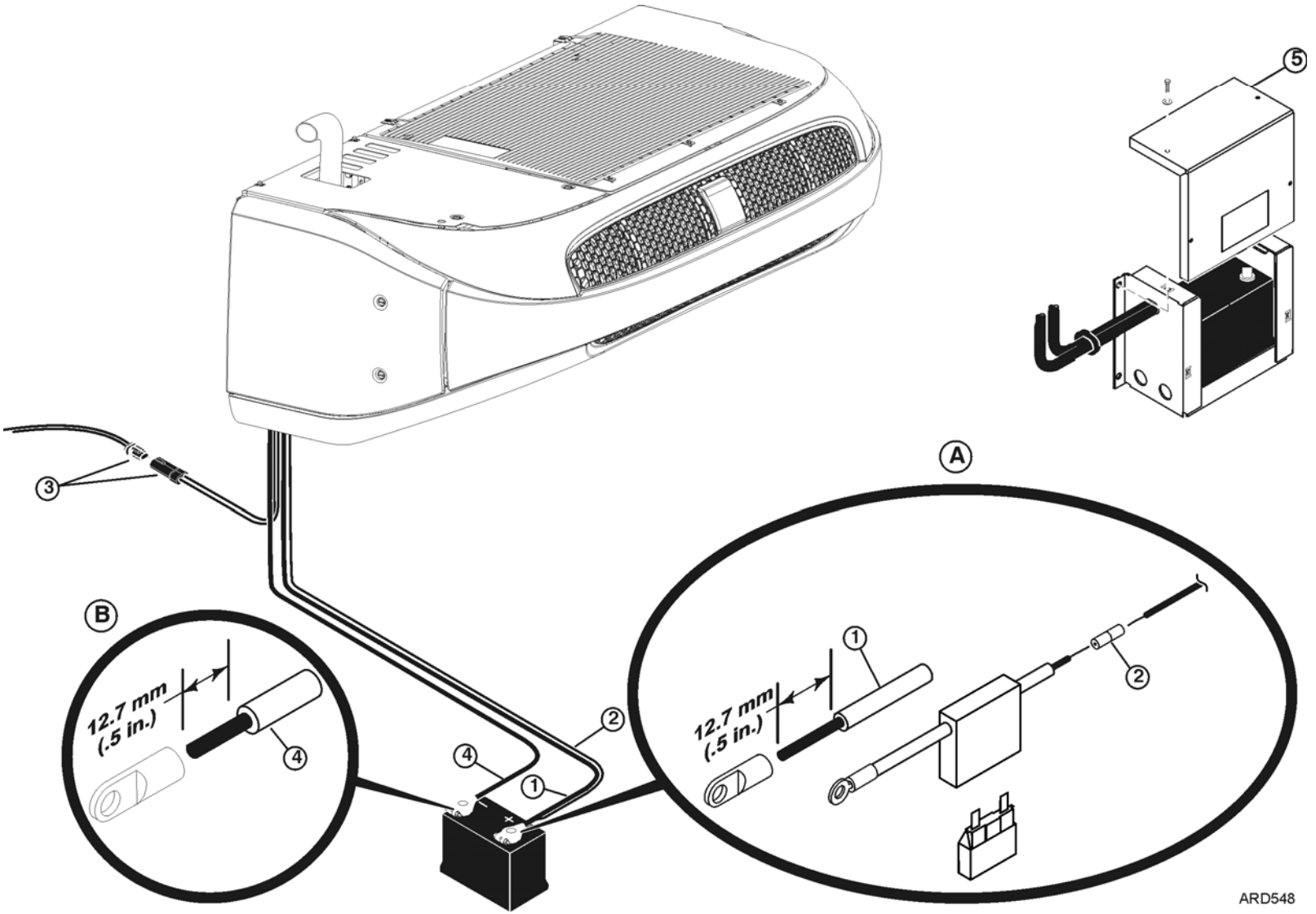
Fuel Pump Harness

3. Route and connect the fuel pump harness to the fuel pump.

Negative Cable

4. At the unit, locate the large black cable marked **NEG -**. Route this cable to the battery, cut to the proper length and add the battery lug from installation kit.
   - Route the negative cable **(NEG -)** into the battery box through the rubber grommet and connect to the **NEGATIVE** terminal of battery **(Detail B)**.
5. Install the battery box cover securely.
6. All harnesses and battery cables should be neatly routed and secured with provided clamps.

Battery Connections



Installing the Door Switch (OPTION)

When installing CargoLink wireless door switches, see TK 55151 CargoLink Installation Manual.

NOTE: These instructions are intended as reference guide only to assist with a typical door switch installation. Your installation may be different depending on the cargo box, the amount and types of doors and the customers particular requirements.

Door Switch Components

The door switch consists of a magnet, a switch, non-magnetic mounting hardware and a interface harness to connect to the host unit.

- The ***magnet*** is always mounted on the door.
- The ***switch*** (with harness) is always mounted to a stationary location.

Non-magnetic mounting hardware is included to install the switches. If alternate hardware is used it must also be non-magnetic or the door switch will not operate properly.

Installer is to supply and fabricate the harness connecting the interface harness to the door switch per the table below. The harness should be 18 AWG or better, 3 wires, color coded RED, BLACK and WHITE

Interface Harness Wiring	Door Switch Wiring
RED = (DSP) POWER	RED = (DSP) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

Mounting Locations

The door switch can be mounted on the inside or outside of either swing out or roll-up doors and can be mounted in various positions to accommodate particular applications.

IMPORTANT INSTALLATION NOTES:

- The door switch must be installed away from traffic (i.e. forklifts) or protected from it.
- The door switch and magnet must be installed parallel to each other, not perpendicular. Long cross hair aligns to long cross hair.
- It is important that a maximum gap of 19 mm (0.75 in.) is maintained between the door switch and the magnet. Shims may be required and must be a non-magnetic material (aluminum, wood, plastic, etc.) or the door switch will not operate properly.

(Detail A) Ceiling Mounted

1. Mount the **magnet** flush with the top edge of the door and secure with supplied hardware.
2. Close the door and mount the **switch** to the door sill parallel with the magnet, being sure the “cross hairs” are aligned and that the maximum gap of 19 mm (0.75 in.) is maintained.

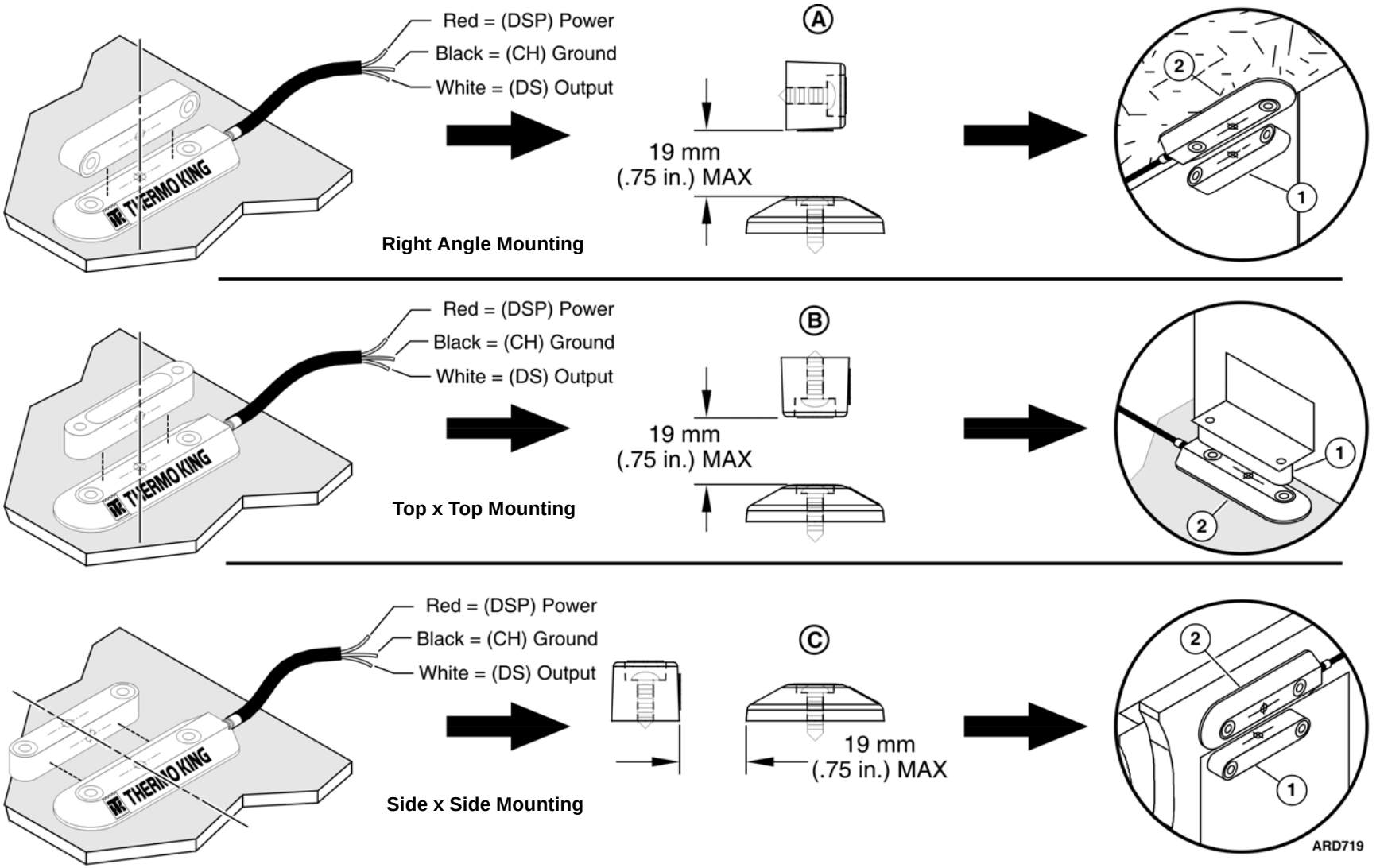
(Detail B) Floor Mounted

1. Mount the **magnet** flush with the bottom edge of the door and secure with supplied hardware.
2. Close the door and mount the **switch** to the floor parallel with the magnet, being sure the “cross hairs” are aligned and that the maximum gap of 19 mm (0.75 in.) is maintained.

(Detail C) Outside Door Installation

1. Mount the **magnet** flush with the top edge of the door and secure with supplied hardware.
2. Close the door and mount the **switch** to the door sill parallel with the magnet, being sure the “cross hairs” are aligned and that the maximum gap of 19 mm (0.75 in.) is maintained.

Installing the Door Switch (OPTION)



Installing the Door Switch (OPTION)

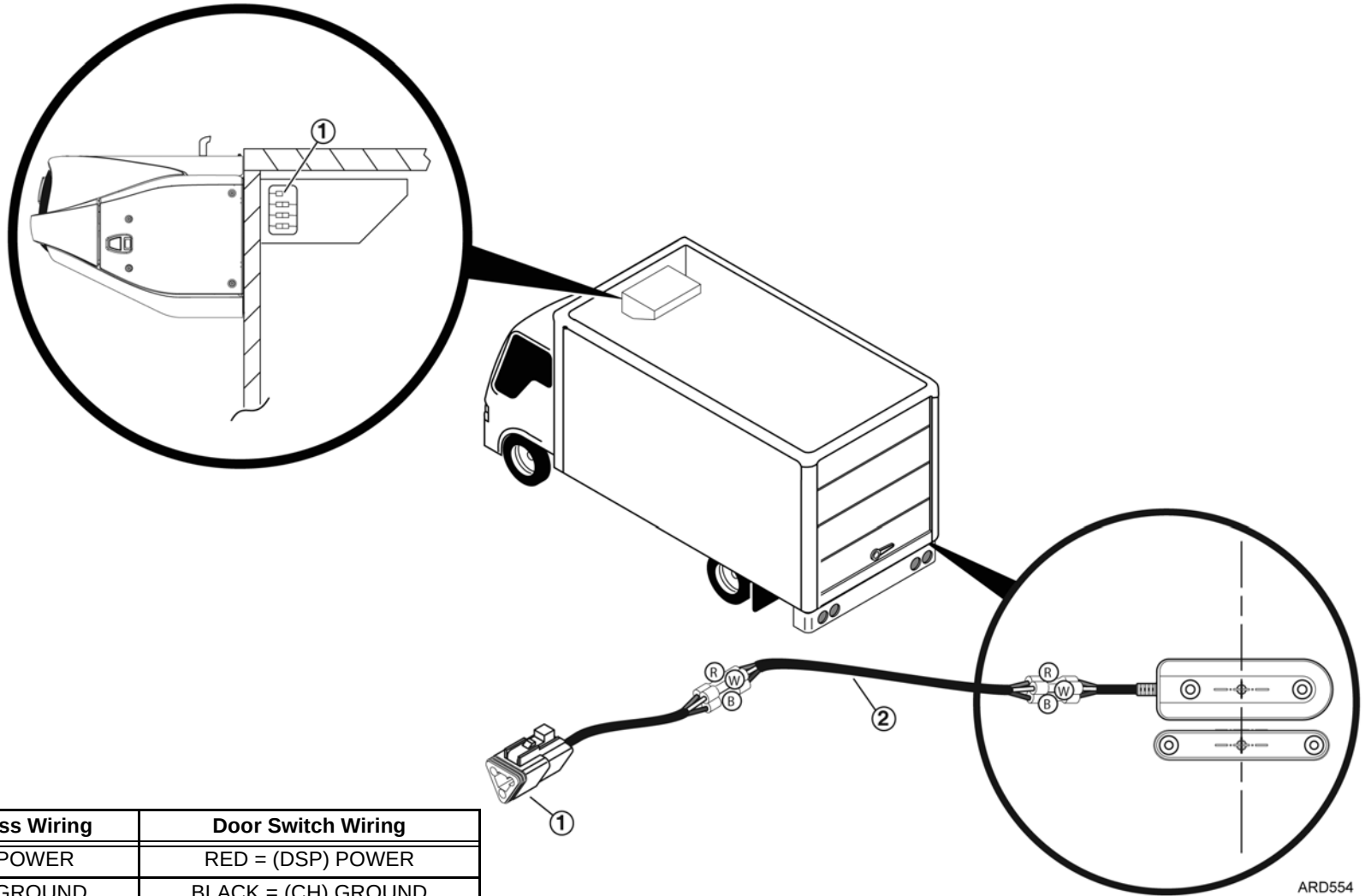
NOTE: The Door Switch Harness Connectors are located at the rear of the host unit.

1. Attach the interface harness to matching door switch connector located at the rear of the host unit.
2. Route a 3 wire harness (INSTALLER SUPPLIED) from the interface harness to a door switch. Connect matching wires per the table below **(RED/RED, WHITE/WHITE, BLACK/BLACK)** to each door switch using splice connectors. Crimp splice connectors securely and apply heat with a heat gun.

Interface Harness Wiring	Door Switch Wiring
RED = (DSP) POWER	RED = (DSP) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

3. All harnesses should be installed, routed and properly secured to protect from damage.
4. Operate unit and verify door switch operation.

Installing the Door Switch (OPTION)



Interface Harness Wiring	Door Switch Wiring
RED = (DSP) POWER	RED = (DSP) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

UNIT CHECK LIST

UNIT CHECK LIST

- ☐ Visually inspect the unit for transit and handling damage. File claim with delivery carrier.
- ☐ Install the unit as outlined in the Thermo King Installation Manual.
- ☐ If the unit has a separate fuel tank add 10 gallons of fuel to the tank.

BEFORE STARTING THE UNIT

- ☐ Check battery and battery cable installation.
- ☐ Inspect fuel line routing checking for rubbing, chaffing or laying on hot surfaces.
- ☐ Visually inspect the unit for the following: Loose or improperly fitting bolts, brackets, hardware, hose connections and hose routing.
- ☐ Inspect all wiring connections and routing.
- ☐ Check defrost drain hoses and kazoos.
- ☐ Check unit mounting hardware for tightness.
- ☐ Check compressor and engine mounts.
- ☐ Check compressor clutch if equipped.
- ☐ Install refrigeration gauge manifold. (Multi-Temp units only)
- ☐ Check engine oil level.
- ☐ Check condenser and evaporator section for cleanliness and signs of refrigerant leaks.
- ☐ Check front bulkhead and air chute if equipped.
- ☐ Check damper door, bushings and springs.

MULTI-TEMP UNITS (REMOTE EVAPORATORS)

- ☐ Check evaporator(s) sections for cleanliness.
- ☐ Leak test interconnecting tubing.
- ☐ Check for damage, loose or missing bolts and hardware on remote evaporator(s).
- ☐ Check for proper installation of drain tubes, drain kazoos and drain tube heater wires.
- ☐ Check for properly routed refrigerant lines wiring harnesses for remote evaporator(s). Check for properly routed harnesses for remote controller.
- ☐ Check for proper installation of remote evaporator guards if equipped.
- ☐ Check remote harness wiring plugs in the host evaporator.
- ☐ Check wiring, connections, and terminals in the remote evaporator(s).
- ☐ Check compartment bulk head(s) for proper fit if equipped.

START AND RUN UNIT (ON MULTI-TEMP UNITS START ONLY THE HOST UNIT)

- ☐ Check for proper oil pressure, coolant temperature, oil, fuel, or coolant leaks.
- ☐ Check alternator charge.
- ☐ Cycle the unit and ensure the unit functions in the correct modes and the mode indicators are working.
- ☐ Set for continuous run with thermostat set point at 32 F (0 C) and run the unit to 32 F (0 C).

UNIT CHECK LIST (continued)

- ☐ Observe and record refrigerant operating pressures in relation to ambient and box temperatures.
- ☐ Verify the readings above are correct for the conditions.
- ☐ When box reaches 32 F (0 C) check calibration of thermostat, thermometer and data logger.
- ☐ Run unit for 30 minutes at 32 F (0 C). During this period check for correct cycling.
- ☐ Reset thermostat to 50 F (10 C).
- ☐ Check throttling valve while in the heat cycle.
- ☐ Check operation of Modulation system if equipped.
- ☐ For Single Temp units perform a controlled check of the refrigerant level. For Multi-temps check the charge per multi-temp unit procedures.

MULTI-TEMP UNITS

- ☐ Install the compartment bulk head(s) if equipped.
- ☐ Check for correct rotation of remote evaporator fans.
- ☐ Check for correct cycling and operation of remote evaporator fans.

ALL UNITS

- ☐ Initiate and check defrost operation and termination.Check operation and adjustment of damper door and remote fans. Each zone on multi-temps must be checked for proper operation.
- ☐ Set the unit for Cycle Sentry Operation.
- ☐ Check for proper operation of all door switches.
- ☐ Remove the compartment bulk head(s) if equipped.
- ☐ Set the unit for continuous run. Continue to run the unit with the back doors open, alternating between high speed cool and heat until at least 6 hours (10 hours preferred) are shown on the engine run time hour meter to ensure complete break in of the engine, time for the belts and other moving parts to take out the initial tension and adjustment.

ELECTRIC STANDBY OPERATIONAL CHECKS

- ☐ Test AC electrical contacts and connections by connecting to AC power and running.
- ☐ Check for correct electric motor rotation.
- ☐ Cycle thermostat and check for correct modes of operation.
- ☐ Power source not available to test AC.

STOP UNIT

- ☐ On Multi-temp units leak test interconnecting tubing.
- ☐ Check and readjust all belt tensions using TK belt gauge 204-427.
- ☐ Check for oil, fuel, coolant, refrigerant and exhaust leaks.
- ☐ Check engine oil and coolant level.
- ☐ Check entire unit for loosened hardware and fittings.
- ☐ Check and adjust all skin, door and panels for correct alignment and operation.
- ☐ Complete the commissioning registration process.
- ☐ Release unit.

Ingersoll Rand's Climate Solutions sector delivers energy-efficient HVACR solutions for customers globally. Its world class brands include Thermo King, the leader in transport temperature control and Trane, a provider of energy efficient heating, ventilating and air conditioning systems, building and contracting services, parts support and advanced controls for commercial buildings and homes.

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